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OPERATIVE TECHNICS FOR THE TOOTH AND THE CHILD

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The aim of pedodontics is to bring the child to maturity in as good physical, mental and emotional health as possible. This means that the dentist who treats children must do more than "fill" and "extract" teeth. He must treat the tooth and the child.

One who examines many children cannot but be unfavorably impressed by the quality of a great percentage of the dental service allotted to the child. Dentists are more interested in the expansion and contraction of gold, amalgams and investments than they are in the expansion of the child's jaws, in child management or in the recognition of intraoral manifestations of general and local disease. Too often, one sees amalgam fillings that are fractured, broken away from margins or simply lost. Too often, one sees, opposite teeth with satisfactory restorations, fistulous openings, the result of too zealous cavity preparation or the lack of pulp protection. One even finds infected deciduous teeth and roots remaining in the arch to "hold the space."

Conversations with the parents of these children are revealing. Many parents are amazed and very much pleased to learn that roentgenograms can and should be taken for their children. They are glad to know that record models made at frequent intervals are valuable in observing growth and development and an aid in detecting the beginning of irregularity. They are happy to receive dietary suggestions for the control of dental caries and instructions in the correct technic of toothbrushing. Their most enthusiastic response is manifested when they are informed that, in most cases, dental service can be a pleasant experience for children.

Introducing Dentistry to the Child

A successful outcome of most operative procedures in pedodontics depends first on the ability of the dentist to manage the child, which is not difficult if the dentist is honest, patient and consistent in his treatment; if he recognizes the child as an individual, and if he exercises a reasonable amount of judgment.

The following suggestions are helpful in formulating an "approach" to the child. A special corner should be reserved

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for the child in the reception room. A small table and chairs, picture books and a few toys should be provided. When the child first enters the operating room, no instruments should be in sight. The room should be clean, free from offensive odors and decorated in pleasing colors. Ample time should be allowed for the child to inspect his surroundings. The dentist's voice and manner should be quiet and matter-of-fact, as well as courteous and sincere, in order to instil confidence in the child and insure a state of composure.

When needed, the instruments should be taken from the cabinet and properly presented for inspection. Almost every

Fig. 1.—Outline form of class two cavity frequently seen in deciduous molars. The silver amalgam placed in these cavities will commonly fracture at *A*.

child is inquisitive. He wants to know "why" and "how." If it is his first visit, he may also be somewhat apprehensive. His apprehension can be relieved if he is first told the name of the instrument and, whenever possible, given a demonstration of how the instrument is used. The use of the rubber cup, burs, stones, etc., may be demonstrated first on the dentist's fingernail, then on the child's. The explorer may be introduced in a similar manner. The child's finger may be held in front of the mouth mirror to show that the mirror reflects objects. The saliva ejector may be lowered into a glass of water to demonstrate how it "drinks" water, and the air syringe may be introduced by blowing air on the child's hand or arm.

Before taking roentgenograms, as well as in all operative procedures, it is wise to tell the child what we are going to do and state what we expect of him. If he has advance instructions, he will cooperate better. The child can be made to feel that he has an important role in this business of getting his teeth "fixed," if he is asked to hold the saliva ejector, dappen dish, waste receptacle or some instrument. This practice will strengthen the dentist-child patient relationship and help to alleviate the child's fears.

The dentist must never lie to a child directly or by implication. If any part of the operation is to be painful, advance

Fig. 2.—Silver amalgam filling that fell out because occlusal step was inadequate.

warning should be given. If we hurt the child, we should thank him for telling us and ask him to say just how he was hurt.

The right words, sincerely spoken, can do much to allay a child's fears and aid in securing his cooperation. In giving commands to young children, the fewer words used, the better. We should not expect an immediate response to our commands. A child's reactions are slower than an adult's. Such words as "pain," "hurt," "cut," "chop" and "slice" should be avoided.

Fear of the dentist or of dental operations can usually be attributed to exaggerated stories of the dental experiences of the child's playmates or parents; or the fear of the dentist has been used by

the parents to discipline the child, or the child has previously had an unpleasant experience with a physician or a dentist. As Pelton[1] suggests, providing the child with a signal that he can use when he wants the drilling stopped, and praising the child for his fortitude and for being a good patient, are excellent for helping the child to overcome his fright.

The use of bad-tasting medicaments should be avoided whenever possible. All mouthwashes, disclosing solutions and pastes used for prophylaxis and polishing silver or gold fillings should be flavored. A drop of oil of wintergreen in a glass of water makes a pleasant mouth rinse. Easlick has suggested a

Fig. 3.—Proximal cavity walls flaring extensively toward the buccal and lingual aspects. Weak amalgam margins are the result (*A*).

formula for a prophylaxis paste which is very satisfactory for children:

Flour of pumice	170 gm.
Borax	30 gm.
Glycerine	75 gm.
Carmine	0.25 gm.
Oil of spearmint	1 drop

If the child is to retain a pleasant memory of his visit to the dentist, provision should be made for his comfort in the dental chair. It is impossible to lower the back and headrest of the average dental chair sufficiently to position a small child properly for operating. With the back and headrest adjusted to the lowest position, the child's head is thrown forward, so that his chin is almost resting on his chest. With the head in this position, it is difficult for the child to open his mouth and very toilsome for the dentist to operate. In a seat placed over the arms of the chair, the child is elevated so that his back and shoulders fit the back rest and his head can be properly positioned in the headrest. This makes the whole dental procedure more comfortable and less tiring for the child as well as for the dentist.

The dentist should keep in mind that the chronologic, physiologic, mental, dental and other ages of children do not always develop harmoniously. Recent

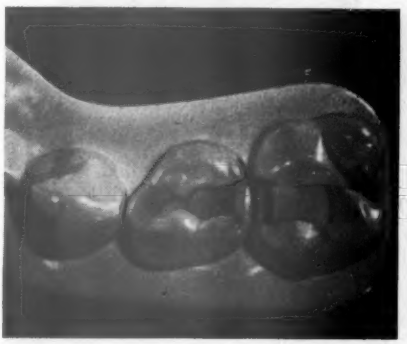

Fig. 4.—Acceptable class two cavity preparation.

research has disclosed that behavior is closely associated with growth, and it has been suggested that perhaps one of the underlying factors in the "problem child" is an inharmonious development of these various ages.

Modified Operative Procedures for the Primary Teeth

A knowledge of the anatomy and histology of the deciduous teeth will not only aid the dentist in his treatment planning, but will also improve his operative procedures. The dentist who works for children should know that (1) the pulps of the deciduous teeth are larger in comparison with the size of the crowns

1. Pelton, W. J.: Fear Control in Children's Dentistry. J.A.D.A., 26:1381, August 1939.

than those of the permanent teeth; (2) the horns of the deciduous tooth pulp extend for a greater distance into the crowns of the primary teeth than is commonly the case in the permanent teeth; (3) the enamel and dentin of the primary teeth are thinner than those of the permanent teeth, and (4) the enamel rods in the gingival third of the deciduous teeth extend from the dentinoenamel junction occlusally or incisally. The corresponding enamel rods in the permanent teeth extend apically.

The dentist should also know that he can expect to find a pulpal horn under each cusp; that the mesial pulpal horns of the deciduous molars are higher than the distal pulpal horns, and that the pulp chambers of the mandibular molars are usually larger than the pulp chambers of the maxillary molars.

Fig. 5.—Proximal view of class two cavity. The pulpal-axial line angle and the proximal-gingival angles are rounded.

The management of class one cavities in the deciduous teeth presents little that is different from the management of those in the permanent teeth. The preparation and restoration of class two cavities presents problems requiring special consideration.

The most common errors in class two cavity preparations are:

1. Buccolingual preparations at the junction of the proximal and the occlusal portions that are too narrow. (Fig. 1.)

2. Inadequate preparation of the occlusal step. (Fig. 2.) In many preparations, there is no attempt to do more than "scoop" out the carious dentin.

3. Extreme tapering toward the buccal and toward the lingual aspect of the walls of the proximal preparations. (Fig. 3.)

Acceptable class two cavity preparations for the deciduous teeth are illustrated in Figures 4 and 5.

Interproximal cavities in the deciduous molars are usually found in pairs, one on the mesial surface of the second molar and one on the distal surface of the first molar. If these cavities are incipient, they can be handled by preparing a distoclusal cavity in the first molar, followed by a proximal spot preparation in the second molar. The proximal spot cavity is filled with silver amalgam and temporary stopping is placed in the class two prepared cavity. At the next appointment, the proximal spot filling is polished and the distoclusal cavity is filled with silver amalgam.

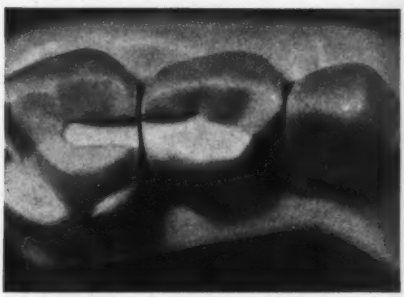

Fig. 6.—Approximating class two cavities. Access is gained through the occlusal surface by means of a moist knife-edge stone.

If it is not advisable to use a proximal spot preparation in the second molar, a class two preparation is indicated. Considerable time can be saved if the two preparations are made in one operation. By starting with a small moist knife-edge

stone and going back and forth between the two teeth, access is gained through the occlusal surfaces. (Fig. 6.) This opening is widened by using a small moist straight stone. (Fig. 7.) The proximal portions of the cavities are next prepared with a No. 557 fissure bur and the walls of the occlusal step and dovetail are straightened with the same bur. (Fig. 8.) The cavities are completed by placing a small U-shaped retention groove on the gingival aspect. The U groove is made with a No. ½ round bur. The occlusal step, if desired, may be undercut with a No. 33½ inverted cone bur or a stone of similar shape.

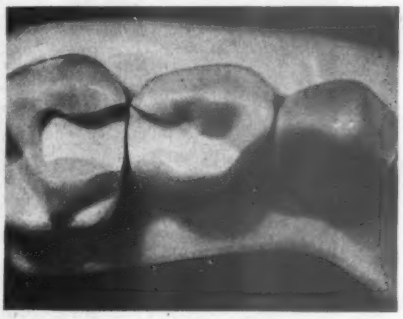

Fig. 7.—Cavities occlusal portion of which has been enlarged by means of small moist straight stone.

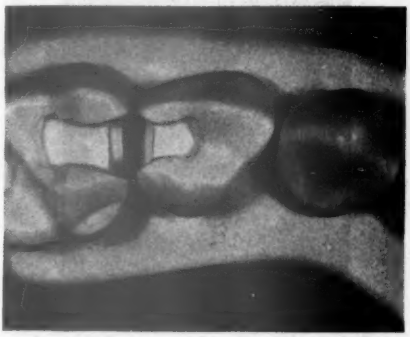

Fig. 8.—Finished cavities. The two cavities may be prepared with two burs (No. 557 fissure bur and No. ½ round bur) and two stones (C4363 knife-edge stone and No. C3623 small straight stone).

It is essential that the contacts between the deciduous cuspids and first molars, between the deciduous first and second molars and between the deciduous second and permanent first molars be restored when cavities are filled so that the mesial distal space will not be lost. The loss of this space is frequently the cause of a future malocclusion. Restoration of contact and tooth form also helps reduce the possibility of periodontal involvement from impaction of food between the teeth.

Cavities in the distal surface of cuspids can be successfully managed by placing a silver amalgam filling in a distolingual cavity. (Figs. 9 and 10.) This procedure insures the maintenance of contact between the cuspids and the first molars, a precaution to promote lateral arch development. The same precaution applies as for the class two cavity; i. e., the lingual dovetail should not be too narrow at the junction of the lingual and distal portions of the cavity.

It is impossible to condense silver amalgam in a class two cavity and restore tooth form without a properly contoured matrix band. A satisfactory matrix band for the deciduous teeth can be made from stainless steel matrix material 0.002 inch thick. A strip of the material, approximately three-sixteenths inch wide, is cut and placed around the tooth. With the thumb or index finger holding the band material on the lingual aspect, the two ends are pulled together on the buccal side of the tooth with flat-nosed pliers. (Fig. 11.) The band is removed and the two right angle bends are brought together and held by orthodontic soldering pliers. Any portion of the band material that extends more than one fourth inch beyond the right angle bend is removed. A small amount of lead solder flux is applied to the inside of the band where the right angle bends are

joined, and the seam is soldered with lead solder. Only a small amount of lead solder is necessary and the heat from an alcohol lamp is preferable to that of a bunsen burner or orthodontic blowpipe. The excess material is removed, the solder joint is smoothed and the band is ready to be placed on the tooth for recontouring. The band should fit the tooth tightly and should not extend more than one eighth inch beyond the contemplated height of the marginal ridge. (Fig. 12.) This matrix is also used for distolingual cavities in cuspids. By cutting a half-moon portion from the lingual side of the band, the silver amalgam can be placed and condensed in the cavity from the lingual aspect. When it is time to remove the matrix band, the operator can open the soldered joint by cutting it with a knife-edge stone, prying it apart with a small spoon excavator, or by holding soft silver amalgam against the joint for a few seconds.

Fig. 9.—Proximal view of distolingual cavity prepared in deciduous cuspids.

A wedge should be inserted at the gingival aspect to prevent an overhang of silver amalgam. A modification of the wedge that Sweeney has suggested for the permanent teeth is adequate. This wedge is cut from tongue blades and shaped as illustrated in Figure 13. For class two cavities in the maxillary molars, the wedge is inserted from the lingual side. For class two cavities in the mandibular molars, the wedge can be placed from either the buccal or the lingual side. (Fig. 14.) In restoring class three cavities in the distal surface of cuspids, the wedge should be inserted from the labial aspect.

Most of the instruments used to condense silver amalgam are designed for use in cavities in the permanent teeth. These instruments are not completely satisfactory for use in deciduous teeth. Sweeney

Fig. 10.—Cavity prepared in distolingual surface.

believes that amalgam condensers should be designed "to fit the cavity in the tooth in the same manner that the pluggers fit the molds used by the physicist."[2] With this idea, three condensing points were designed for use in deciduous teeth. (Fig. 15.) They are used in a demountable Sweeney handle. (Fig. 16.) In designing these points, an effort was made to include all the features which Dr. Sweeney embodied in the points that he designed for the permanent teeth. The No. 1p point is used to condense silver amalgam in the proximal portion of class two cavities. The No. 2p point is

2. Sweeney, J. T.: Amalgam Manipulation: Manual vs. Mechanical Aids. Part 2. Comparison of Clinical Applications. J.A.D.A., 27: 1943, December 1940.

used for the occlusal portion. The No. 3p point is designed for use in the proximal portion of distolingual cavities in cuspids. A fourth point will soon be perfected for use in small class one cavities and proximal spot cavities and in the lingual step of distolingual cavities in cuspids.

Deep carious areas in the deciduous teeth can be successfully managed by removing all of the soft carious dentin, applying ammoniacal silver nitrate and eugenol and restoring the cavity to form

Fig. 11.—Band material pulled together on buccal side of tooth with flat nose pliers.

with a suitable base. One of the best bases is a paste of zinc oxide and eugenol. North[3] has suggested that if a considerable amount of zinc oxide is mixed with the eugenol and this mixture is pressed between sheets of cleansing tissue, placed in a piece of rubber dam and triturated for a short time, a workable paste will result. This technic, with few alterations, has been used with considerable satisfaction. A thick mixture of zinc oxide and eugenol is placed in an amalgam squeeze cloth, which is twisted tightly and then rubbed vigorously in the palm of the hand. This operation is repeated and a stiff, workable paste results. The paste is carried to the cavity by an amalgam carrier or cotton pliers, or on the end of a spoon excavator.

If the cavity is extensive, the zinc oxide and eugenol paste is placed over the silver nitrate treated dentin and the cavity is restored to the desired shape with cement. When the carious process closely approaches the pulp or the pulp is in a state of active hyperemia, it is advisable to allow the pulp time to return to its normal condition and to build additional secondary dentin before the final restoration.

Restorations of the deciduous molars of a 3-year-old child should remain in good condition for from six to eight years. Tooth form should be restored and function maintained throughout this period. Therefore, only those materials that meet these requirements should be used. Silver amalgam, gold or silver alloy inlays are the best known means for restoring carious deciduous molars. The many unfavorable qualities of copper amalgam eliminate it from any serious consideration as a permanent filling material. Silicate or silver amalgam is best for restoring cavities in the anterior teeth.

Our experience indicates that the primary teeth are not so sensitive to drilling as are the young permanent teeth. We do not, therefore, advocate the use of procaine as a routine procedure in cavity preparation in the deciduous teeth. It should be used without hesitation if the child experiences pain. Certain writers advance the theory that since the roots of the deciduous teeth are undergoing resorption, there is a greater blood supply, and this increased blood supply lessens the pain. Our findings have been similar to those of Bodecker:

The deciduous teeth, on the other hand,

3. North, E. J.: Protecting Pulp in Deciduous and Young Permanent Teeth. J.A.D.A., 31:86, January 1, 1944.

appear to mature more rapidly. Their crowns seem to pass through their cycle of development quickly and reach complete maturity at the age of 8 to 10 years. This may be one of the reasons that the deciduous teeth are not so sensitive to the dental drill as those of the permanent dentition.[4]

Pulp exposure in the deciduous teeth is treated by capping or by partial pulpectomy. Best results are obtained from pulp capping when the exposure is minute and of instrumental origin. Rosenstein[5] reported the successful capping of deciduous tooth pulps with incipient degeneration of the pulpal horns. In this study, zinc oxide and eugenol, zinc oxide and thymol and zinc, copper and silver cement mixed with special silver nitrate cement liquid were used as the capping agents, with equally good results. The use of calcium hydroxide as a pulp-capping material has recently been reported.[6, 7]

In a vital pulp exposure in a deciduous molar, it is our practice to resort to partial pulpectomy. Easlick's[8] technic has been followed for this operation, with 85 to 90 per cent success. Pulp capping has been attempted in a few cases recently, with zinc oxide and eugenol paste and calcium hydroxide mixed with sterile distilled water as the capping agents. After the carious dentin is removed, phenol is applied to the exposed pulpal horn and adjacent dentin. The pulp capping material is gently placed over the exposed pulp and a cement filling is inserted. Silver alloy mixed with the cement powder will prolong the life of the cement filling. After a period of from six to eight weeks, the tooth is tested for vitality and a roentgenogram is taken. If the vitality test proves satisfactory and the film reveals an absence of infection, a permanent filling is substituted for the cement filling. Part of the cement filling is left in the cavity as a base.

If the pulp is infected, the choice of extraction or complete pulpectomy is open to the dentist.

The practice of leaving abscessed deciduous molars and tooth roots in the arch

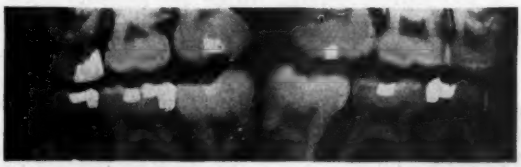

Fig. 12.—Proximal surfaces of silver amalgam fillings with correctly contoured matrix bands (mandibular molars) and with incorrectly contoured matrix band (maxillary first molar).

Fig. 13.—*A*, wedge used in class two cavities. *B*, wedge used in distolingual cavities in cuspids. Wedges should be immersed in water before use.

4. Bodecker, Charles F.: Histologic Evidence of Benefits of Temporary Fillings and Successful Pulp Capping of Deciduous Teeth. J.A.D.A., 25:783, May 1938.

5. Rosenstein, S. N.: Pulp Capping in Deciduous Teeth: Report of Ten Year Study. J.A.D.A., 29:1632, September 1, 1942.

6. Easlick, K. A.: Management of Pulp Exposure in Mixed Dentition. J.A.D.A., 30:179, February 1, 1943.

7. Dillon, Charles: Experiments in Pulp Therapy by Application of Calcium. Brit. D. J., 70:365, May 15, 1941.

8. Easlick, K. A.: Pulp Management for Deciduous and Young Permanent Teeth. J.A.D.A., 26:100, January 1939.

to hold space cannot be too strongly condemned. Not only is the child's health jeopardized by this practice, but also, in the majority of cases, the adjacent tooth moves into the proximal cavity of the infected tooth, and, as a result, the space is not maintained. The tooth, if it cannot be restored to function and the infection eliminated, should be extracted.

When a posterior deciduous tooth is lost early, the dentist should be concerned about the possible loss of the mesiodistal space. Here again, dentists often sidestep the problem, doing nothing and placing their faith in Nature. In a survey of 158 untreated cases at the Forsyth Dental Infirmary covering a ten-year period, Silver reported closure of space in 73.5 per cent. He says:

> But the most important factor in summarizing is that the premature loss of any deciduous canine or molar will usually result in the loss of space in whole or in part. At this point, to correlate with a previous statement, let me say that I believe the increase in the incidence of malocclusion as the age increases may be considered in part due to the premature loss of deciduous teeth.[9]

Brauer concludes after observing 113 cases:

> Approximately one-third of the first primary molars removed early or prematurely will lead to closure of space and malocclusion. At least one out of every two of the second primary molars removed early or prematurely will result in closure of space and malocclusion.[10]

Because the space does not close in all cases, the dentist may discharge his obligation to the child by either measuring the space immediately after extraction or taking a compound impression of the area and making a cast. The child should be asked to return frequently and the space measured for comparison with the plaster model. When a space maintainer is indicated, a modified Willett's type is considered satisfactory.

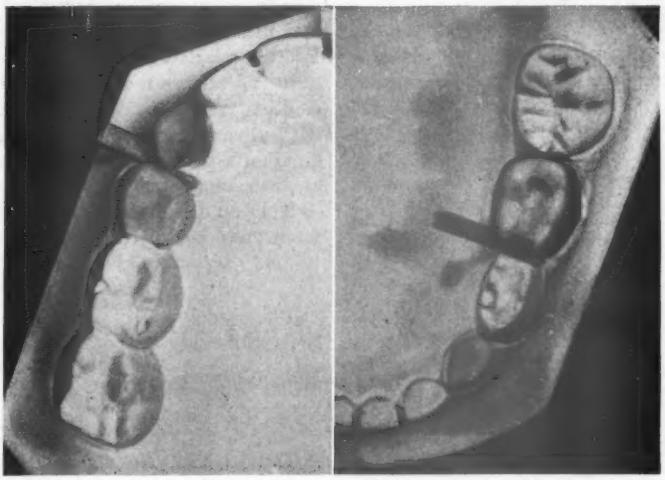

Fig. 14.—Right: Wedge in place for preparing class two cavity. The wedge may be inserted from the buccal side. Left: Application of wedge for distolingual cavities in cuspids.

9. Silver, E. I.: Forsyth Orthodontic Survey of Untreated Cases. Am. J. Orthodontics, 30:654, December 1944.

10. Brauer, J. C.: Report of 113 Early or Premature Extractions of Primary Molars and Incidence of Closure of Space. *J. Dent. for Child.*, 8:224, 1941.

Summary

1. Adequate dental service for children imposes on the dentist a greater responsibility to his young patients than he has, in the past, been willing to assume.

2. The dentist who treats children should (1) understand the management of the child in the dental chair; (2) have a working knowledge of operative procedures necessary for the care of deciduous and young permanent teeth; (3) supervise the child's dental growth and development as they relate to the growth and development of the child as a whole, and (4) recognize the intra-oral manifestations of general and local diseases.

3. The child's association with dentistry will be more pleasant if the dentist's approach is based on (1) an appeal to the child's special senses; (2) recognition of the child as an individual; (3) careful choice of words and an assuring tone of voice; (4) proper introduction to instruments, and (5) consideration of the comfort of the child in the operating room.

4. A thorough knowledge of the anatomy and histology of the deciduous teeth will improve operative procedures.

5. Class two silver amalgam fillings will not fracture so frequently and they will remain in the teeth longer if (1) the cavity outline of the occlusal portion meets the cavity outline of the proximal portion at approximately a 90-degree angle and (2) an adequate occlusal step is prepared.

6. Fillings should restore contact between the deciduous cuspids and first molars and between the first and second deciduous molars, in order to preserve the mesiodistal space and to promote lateral arch development.

7. To restore tooth form, in class two cavities, a matrix should be employed with silver amalgam. A wedge at the gingival aspect will prevent an overhang of silver amalgam.

8. Deep carious areas in the deciduous teeth can be successfully managed by removing all of the soft carious dentin, applying ammoniacal silver nitrate and eugenol and restoring the cavity to form with a suitable base.

9. Silver amalgam, gold or silver alloy inlays are the best materials with which to restore cavities in the deciduous molars. Silicate of silver amalgam is best for cavities in the anterior teeth.

10. Because the deciduous teeth are not so sensitive to drilling as are the young permanent teeth, the use of procaine is not always necessary. If the tooth is sensitive to drilling, the drug may be used.

11. Pulp exposure in deciduous teeth

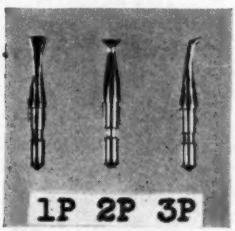

Fig. 15.—Condensing points designed for cavities in deciduous teeth.

Fig. 16.—Condensing points in holder.

may be treated by pulp capping or partial pulpectomy.

12. Infected deciduous molars and tooth roots should not be left in the arch to hold space. The tooth should be extracted if it cannot be restored to function and the infection eliminated.

13. Early loss of the deciduous cuspids and molars is frequently the cause of malocclusion in the permanent dentition. When a space maintainer is indicated, a modified Willett's type is satisfactory.

SIMPLIFIED CLASP PARTIAL DENTURES DESIGNED FOR MAXIMUM FUNCTION

Victor L. Steffel, D.D.S., Columbus, Ohio*

New discoveries, abbreviated procedures and simplified technics may come, and fads and materials that gave great promise may go, but the intricacies involved in removable partial denture construction seem to be always with us. Many writers regard this as the most difficult specialty of dentistry. At any rate, removable partial denture procedures unquestionably constitute the most neglected as well as the most abused branch of dental practice. Perhaps the slow development of partial denture science may be traced to the complexity of the subject, but this is no excuse for the fact that many removable partial dentures are forces of destruction.

For the sake of clear understanding, a partial denture may be defined as that form of prosthesis which supplies one or more artificial teeth in a partially edentulous mouth. A partial denture, then, may be a fixed denture, cemented to place; or it may be the removable type, taken out at will by the patient. This paper will deal mainly with the removable partial denture that is retained in place with clasps. Precision attachment partial dentures are in a complex field by themselves. In making a study of the various general practices, noting the countless potential partial denture cases presenting themselves, we at once conclude that the clasp partial denture has universal acceptance as compared with the precision attachment partial denture. It is accepted by the dentist who has the responsibility of fabricating the structure, as well as the patient who has to bear the expense. Though sometimes depreciated by the proponents of the precision attachment or the fixed partial denture, the clasp is the most conservative and most efficient means of anchorage. Also, it necessitates but a minimum of tooth mutilation, in contrast to the frequently overrated precision appliance. The amalgam filling may not be the highest type material for tooth restoration; and yet this silver alloy has been utilized to restore and save more teeth than have all the other filling materials taken collectively. A similar service in the removable partial denture field has been afforded and will continue to be furnished by the simple, properly constructed clasp denture. Let us make no apologies for it.

Again, clasp partial prosthesis comes in for its just share of increased interest and receives a fresh impetus under the new concept of dentistry. This new con-

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Read at the Seventy-Ninth Annual Meeting of the Ohio State Dental Society, November 13, 1944.

cept considers the masticatory apparatus as an entity, putting stress on the interrelation and interdependence of all its parts. This is in contrast to the old school concept of a filling as something to stop a carious cavity, and of a partial denture as a device to put teeth in a space. Latterly, in planning a partial denture, considerations are being directed toward enhancement of the general health of the patient, the oral health of the patient, esthetic improvement, masticating efficiency and especially the preservation of the remaining teeth and other supporting structures. In short, working under the new concept, we strive to improve the

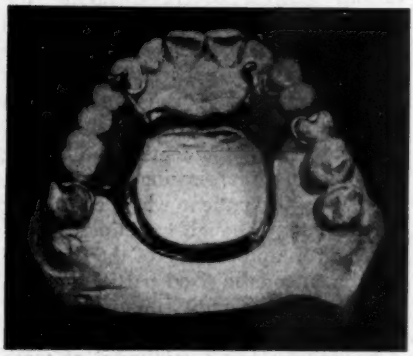

Fig. 1.—Tooth-borne or tooth-supported removable partial denture.

entire entity. We think of the partial denture in its relation to all adjacent structures, instead of replacing teeth just to span a gap.

From mention of the new concept, we move naturally to the related aspects of clasp partial procedures, which are interesting and remunerative. This work is especially applicable to general practice because so many different types of dental service are involved in making successful clasp partial dentures. Among these services are prophylaxis and the taking of roentgenograms of the entire mouth; the extracting of abscessed, broken down or malposed teeth to make way for the partial denture; the constructing of inlays, three-quarter crowns or full crowns, to eliminate caries, and restorations to give teeth the proper contour for clasping, to provide occlusal harmony or to afford occlusal stop support. Frequently, flabby, hyperplastic gum has to be removed or bulbous tuberosities must be operated on before an appliance can be inserted; and even periodontal lesions or pockets must be treated and eliminated before final impressions are made. Certainly no objection is raised to the delegation of some of this work to a specialist; yet all these services, when found necessary, can be performed by the general practitioner.

Along with the mechanics of cases, clasp partial denture procedures must of necessity be influenced by a consideration of the physiologic and biologic laws governing the anatomic structures involved. Otherwise, lasting results cannot be obtained. The combination of these laws is referred to as biomechanics. An application of the laws of mechanics alone is not sufficient. I am of the opinion that only too often just the mechanical phases are considered in planning the appliance, with the result that the supporting tissues suffer slow destruction. This is another way of saying that the design and construction of a partial denture are usually left to a remotely located laboratory technician, who has no knowledge of the case beyond the stone cast before him. He cannot work intelligently from such meager data. The anatomic structures — teeth, mucous membrane and bony support—constitute the denture foundation, for lasting stability. If any of these structures is ignored in planning, the case is doomed shortly to lose the very advantages for which the restoration was made; namely, masticating efficiency, a correct maxillomandibular relationship, esthetic values and preservation of supporting tissues. Only the dentist himself, who sees the arch into which a partial appliance is to

be inserted, possesses an essential knowledge of the living structures and can reach the ideal solution to the biomechanical problem.

Partial denture procedures are, I think, often contemplated with uncertainty and attempted haphazardly by many of the profession because no definite procedure can be applied to each and every case. In full denture procedures, each case is usually quite similar to all other full denture cases. True, different edentulous mouths present a great variation in types of saliva, firmness of tissue support, size of arches and maxillomandibular relationship; but all cases are edentulous, all require full dentures and the essentials of mechanics, balance, arch form, etc., are similar for all. Contrast this picture with that of partial procedures, wherein we find that more than 130,000 different combinations[1] are numerically possible in the same mouth. It is impossible to standardize procedures in a manner to fit all these modifications; but there are fundamentals of design, and, fortunately for us, these fundamental principles do have universal application, even though the partial denture problems are so varied.

In planning our cases, let us always think of a removable partial denture as a permanent appliance. Many dentists consider a partial as the "yellow leaf stage" in the lifetime of the natural teeth—just a "stepping stone" to full dentures. This is a biased perspective, and it certainly cannot be conducive to one's best efforts. Do we think of the insertion of the gold inlay as a temporary therapeutic measure, which will soon result in the loss of the tooth? We insert the inlay to perpetuate the tooth. Neither should we think in temporary terms of the partial denture. A partial denture properly constructed and extended functions indefinitely; and its use will postpone the day of additional tooth losses. It is not intended to be the means

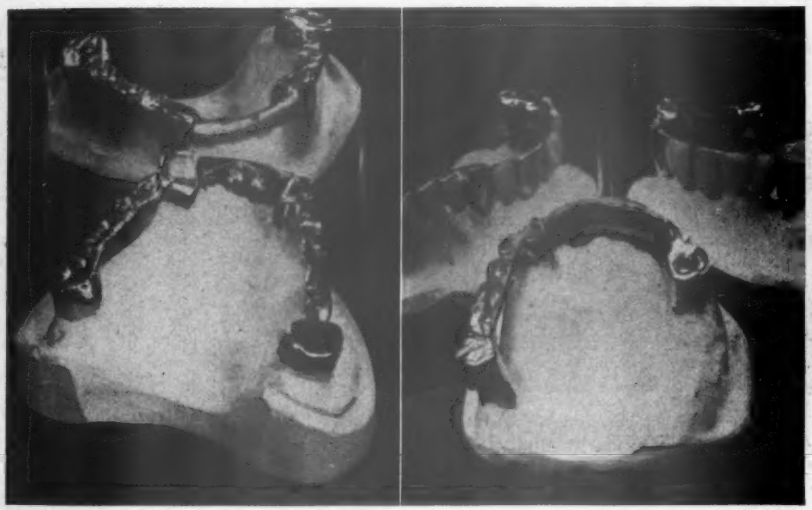

Fig. 2.—Left: Fixed appliance, full arch, retained and supported by four gold shell crowns. Right: Nearly full arch case carried by three crowns.

1. Cummer, W. E.: Combinations Which Occur Between Upper and Lower Six Posterior Natural Teeth in Occlusion. Canadian Dental Research Foundation, June 1924.

of leading up gradually, step by step, tooth by tooth, to the time when the patient will be edentulous. If a partial denture cannot be expected to add additional years to the supporting structures, just as an inlay does to a tooth, it should not be placed. The health and welfare of the patient should always be the prime consideration. "Our objective should be the perpetual preservation of what remains, rather than the meticulous restoration of what is missing." (M. M. DeVan.)

Relatively speaking, the all tooth supported removable partial denture presents no great difficulty as compared

Fig. 3.—Lingual bar, free-end saddle case. A change in saddle support results in change of denture position.

with the extension saddle type of restoration. With clasps and rests for support and stabilization at both ends of saddles (Fig. 1), the tooth supported denture maintains correct position and relationship indefinitely. When rigidly constructed and supported on teeth throughout, it is, in function, quite similar to the old style full arch bridge, fixed in place with crude gold shell crowns (Fig. 2). When this fixed appliance was in use, all component parts were braced so effectively against the thrusts and stresses of mastication that even time seemed to have little effect on the structure.

The free-end saddle case, either unilateral or bilateral, presents the reverse picture, requiring servicing and adjustment with any shift in position due to change in saddle support. The lingual bar case supplying all the posterior teeth distally from the six or eight anterior teeth is an example (Fig. 3). Excessive tissue resorption and consequent change in form of the ridge results in settling of this type denture. This settling, in turn, may exert excessive strain on the attachment teeth if allowed to proceed too far before rebasing. Ac-

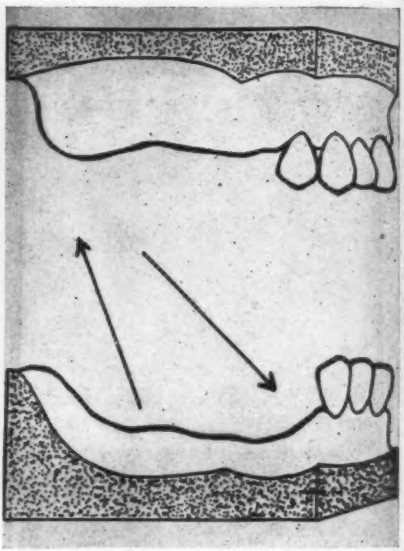

Fig. 4.—Pull of muscles and final closing movement of mandible, in direction of upward pointing arrow; movement and skid of lower denture in direction of other arrow.

cordingly, a patient for whom such a partial denture has been constructed should never be discharged permanently as "having been cured of all the ills which beset the teeth." Periodic check-ups will prevent well-designed cases of this type from falling into the category of mouth wreckers. This extension saddle type of prosthesis has often so discouraged excellent dental operators that they have advised their patients against

its use. Such action is regrettable. Failure of such cases is generally the result of faulty design. Again, the practice of advising the extraction of the lower anterior teeth when a full upper denture is to be worn is likewise regrettable. These teeth, when sound, should be retained, as they will be stimulated and their life prolonged by the application of correct principles of clasp denture design.

While it is strongly urged that lower anterior teeth or any other strong lower teeth be saved to provide stability and support for a clasp denture, it is seldom, if ever, advisable to retain upper teeth when only five or six anterior teeth are remaining. Embracing for one arch what we condemn for the other at first thought seems a contradiction; but this is not the case. In the lower arch, ridge support is poor. The denture has a tendency to skid forward, due to muscle pull and to the mesial slope of the posterior part of the ridge (Fig. 4). A free riding denture has a tendency to dislodge and move laterally in the lower jaw; and there is inadequate tissue coverage as compared with the upper arch. Therefore, the remaining teeth supplement the other support of the artificial denture similarly to Nature's original denture. In the upper arch (Fig. 4), large tuberosities, broad ridges, larger arch size, more resilient tissues, more abundant blood supply and a much greater tissue area for denture coverage and support make a full upper denture quite self-sufficient without the aid of remaining anterior natural teeth. Also, from an esthetic and a mechanical standpoint, extraction of the few remaining upper anterior teeth is generally, though not always, indicated.

In consideration of extension saddle cases, involving tooth support and engagement combined with ridge support, we are at once confronted with a controversy[2] that has engaged the attention of partial denture prosthetists for years. No suitable one-piece impression material has ever been discovered or concocted to give proper functional compression of the soft tissues in relation to the dense hard teeth. Hence, the question: How are we to utilize and equalize ridge support along with tooth support?

In the literature, we find much written on this unsettled question. The writers, by the content of their articles, fall roughly into three groups. One group believes in the use of stressbreakers or stress equalizers. This group emphasizes

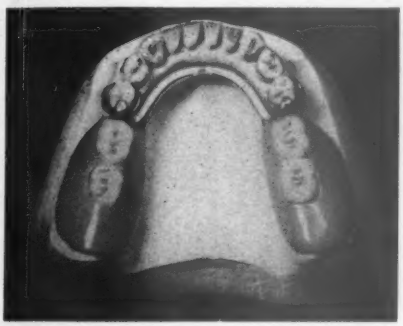

Fig. 5.—Lingual bar, extension saddle, case with stressbreakers (or stress-equalizers) to equalize movement of tooth-supported ends of saddles with that movement allowed by resilient mucosa toward opposite ends.

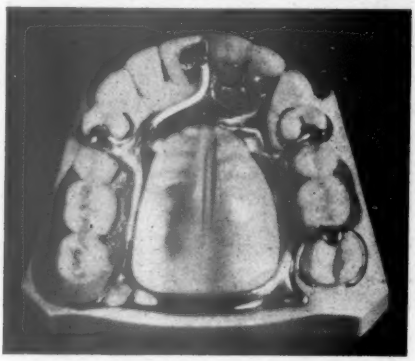

Fig. 6.—Palatal bar case so constructed as to equalize or break stresses.

2. Tic. Contacts, 2: July-August 1941.

the immovability or nonresiliency of teeth in an apical direction as compared with the resiliency of the mucosa, and therefore condemns the rigid connection of clasps to the base and insists on the use of some type of stressbreaker (Figs. 5 and 6).

A second group agrees in emphasizing the relative immobility of teeth in an apical direction, but denies the necessity of stressbreakers and insists that combination and equalization of saddle and occlusal rest support can be accomplished by some form of physiologic basing. This group favors a few relatively mobile clasps, to be used only for retention (Fig. 7).

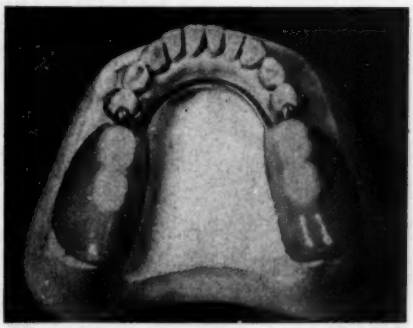

Fig. 7.—Light weight, free-moving clasps, mostly for retention. The saddles have been rebased, providing what is known as physiologic or functional basing.

A third group believes that excessive trauma to both ridges and teeth can be prevented by stress distribution[3] over as many teeth as it may be advisable to engage with rests and rest-supported clasps. In this way, stresses are reduced on any one tooth or ridge, as all collectively bear the load (Fig. 8). Four teeth carrying a load may be physiologically stimulated to robust health, while two teeth carrying the same load may be overworked and traumatized and become loose. Both of the previously mentioned groups engage as few teeth as possible, and these for retention only. The same groups attach little significance or importance to the horizontal shifts of a denture, which are strongly emphasized as destructive by the third group members, who recommend multiple tooth engagement by clasps chiefly to prevent those movements.

To reiterate, we have the first group believing in stressbreakers to equalize tooth and resilient tissue support; then the group believing that "physiologic basing," by the use of a functional impression or by rebasing the denture, is all that is necessary, and then a group placing its confidence in a rigid appliance extended to afford distribution and reduction of stresses (Fig. 9). Scholarly and scientific articles by outstanding members of the profession appear in support of each group.

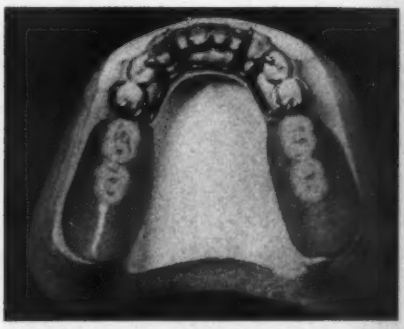

Fig. 8.—Stress distribution probably in excess of normal requirements for average lower denture. All teeth were utilized, along with all possible tissue coverage for support. The supplied teeth were narrowed. The case was designed to overemphasize, but well illustrate, the principle of stress distribution and stress reduction.

The question is often posed: Which constitutes the better clasp partial denture? One fabricated of wrought metals or a cast one? Both are acceptable. The metal skeletons, if structurally per-

3. Schuyler, C. H.: Stress Distribution as Prime Requisite to Success of Partial Denture. J.A.D.A., 22:2148, December 1933.

fect, having sufficient strength and rigidity, no flaws, no checks, no porosity and no grain growth, should be wholly satisfactory whether cast or wrought. Dimensional changes of investments adequately offset dimensional changes in gold in casting, so that one-piece cast cases can now be said really to fit. The design and support are usually much more important than the materials used.

As stated previously in this paper, the extension saddle type of removable denture, chiefly the lower, is the commonest source of trouble; and 80 per cent of cases are of this type. There is a way of handling this type of case successfully, even though the soft tissues and ridge support in the lower arch are far from ideal. These difficult lower cases, as well as similar upper cases, seem best served by a design in harmony with the third school of thought. Therefore, the requirements (Figs. 8, 9 and 10) are that:

1. The major connectors (lingual or palatal bars) must be rigid, to transmit stresses to teeth and saddle areas of opposite sides.

2. As few teeth as possible should be supplied and these should be narrow buccolingually, to reduce occlusal stresses.

3. Saddles should be as extensive as tissues will permit to fully apply the snowshoe principle of great area coverage.

4. Occlusal harmony must be established to take care of both vertical and horizontal interference. Clasp partial dentures, since they involve natural teeth as well as ridges, should be given at least the same care as, if not more care than, full dentures in coordinating the occlusion.

5. The denture must have definite tooth support by multiple clasps and occlusal rests. The greater the number of rests, the better the stress distribution.

6. A functional impression or rebasing, though not always necessary, is never undesirable. No denture base ever fits so well that it cannot be made to fit better by rebasing, as this procedure converts the saddle to functional form.

Clasp partial prosthesis is a responsibility of the dental profession. We cannot dodge the issue simply because it is sometimes perplexing. We cannot delegate this work to any other group; and we cannot deny that there is a definite need for this type of service, as evidenced by the spaces in the dental arches of our patients. Also, in many instances, no other means of occlusal restoration will

Fig. 9.—Palatal bar case further illustrating distribution and reduction of stresses by means of rigid multiple clasps, rigid palatal bars and multiple positive rests. The large free-end saddle has relatively small teeth.

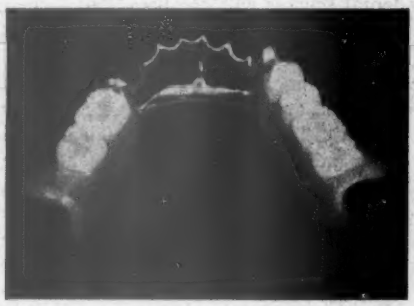

Fig. 10.—Lingual bar case provided with excellent support through stress distribution over all remaining teeth and over all possible soft tissue area. The extra bar adds rigidity for distribution of horizontal lateral stresses.

be nearly so effective as the clasp partial denture. Accordingly, it becomes our duty to so well inform ourselves that we can discriminate between those appliances that are "mouth wreckers" and those that will be efficient, therapeutic "vehicles of function." Then we will be able to render the ideal type of partial denture service ourselves, or be able to write the prescription to be followed by the technician.

19 West Fifth Avenue.

ADMISSION OF VETERANS TO DENTAL SCHOOLS ON THE BASIS OF ACHIEVEMENT TEST SCORES

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Many, if not most, of the discharged veterans who will request entrance to dental schools will not have had formal classroom training in all of those subjects that have always been demanded of them. These students may not present the usual array of college and university grades to be evaluated by the deans and other admissions officers. Instead, the student will probably request admission on the basis of scores received on the United States Armed Forces Institute examinations.

In view of the fact that this new admissions problem will arise in the near future, it is well that deans, instructors and students, as well as others interested in dental education, give it consideration and attention. It is the intention to point out here the purpose of these examinations and to describe their preparation. It is also the purpose to direct attention to some of the points that should be considered in examining the records and test scores of the exservice man or woman who wishes to enter the study of dentistry.

The colleges, universities and high schools have been considering for some time how they are to handle the placement of returning service men who wish to continue their education. Every one agrees that the returning student will not wish to take up his education at the point where he had left it. The high school junior or senior will not want to go back to high school with students five or six years younger than he is. The former college freshman also will not want to go back and begin all over again.

After World War I, various agencies, in their effort to serve and reward the exservice man, generously gave blanket credit to all who had served. Some states and cities were lavish in their gifts and, from an educational standpoint, school certificates and diplomas lost prestige and face value as a result. The various accrediting agencies do not want this mistake of granting degrees gratis to be repeated after World War II. Many suggestions have been made, and the solution which has been acted upon is provision of the means whereby the exservice man can obtain educational credit for his training and experience in the armed forces. This is not to be an outright gift, but an opportunity extended to any exserviceman to apply the experience and knowledge that he has earned in the armed forces toward educational credit in high school, college or university work.

Almost every one is aware of at least

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some of the many educational opportunities that have been given to the men and women in the armed forces. In this war, where victory is largely made possible by scientific knowledge and education, the army, navy, coast guard, marines and other services have seen to it that their soldiers are well prepared. The extensive training program in this war makes the soldiers understand their own function and the operation of their equipment. This is not a war of robots, but of highly trained personnel.

The armed forces have provided their recruits with a wealth of special training. Many have received the highest grade training in electronics, aeronautics, meteorology, mathematics, physics, chemistry, ballistics, physiology, biology and optics, to mention just a few. Others have received training in clerical subjects, filing, classifying, personnel work and the like. In addition to the soldier's training for his war-time job, provision has been made for enrollment of men and women in service in self-study or correspondence type courses. Some of these are given through leading universities and colleges, while others have been designed especially for the service personnel by the United States Armed Forces Institute. The services have established classes for the study of various subjects. They have also planned special training and educational programs for the soldiers who must remain overseas as a part of the occupational forces. Therefore, the soldiers not only are learning through their training programs, but also have been taking advantage of the various courses that have been made available to them in every part of the world where men are stationed.

In addition to providing for the educational development of the soldier, the government has also given attention to helping the soldier to apply these acquired skills, or special abilities, for credit in the educational institution to which he may wish to return.

Many high schools, colleges and universities are already receiving applications from exservice men. Any service man who feels that, from his training and experience, he has learned those things which are offered in a high school, university or college curriculum is encouraged to ask the United States Armed Forces Institute for an opportunity to demonstrate his competence. The USAFI will then make arrangements for him to take examinations in whatever subjects he wishes. It is not necessary that the service man have had any formal training in the subject, but he is expected to know enough about the offerings of the subject to enable him to determine whether he is competent to pass an examination in it. Having taken the examinations that he selects, the service man then directs the USAFI to send his examination record to a school of his choice. If the service man had not completed his high school work, he will probably take certain high school examinations; have his examination record sent to his high school so that he may be given credit for these courses, and receive his high school diploma. In addition to completing his high school work, the service man may take examinations in college courses. In such case, he will submit his high school record and his newly earned high school diploma, along with his USAFI college scores, to the college he wishes to enter.

The exservice man or discharged veteran who decides to take advantage of the USAFI examinations can take them through any of the several Veterans Testing Centers that have been set up.

Three kinds of examinations have been prepared for the United States Armed Forces Institute by its examinations staff, which was located at the University of Chicago under the direction of Dr. Ralph W. Tyler, university examiner and chairman of the Department of Education, University of Chi-

cago. The first kind of examination is the End-of-Course test, the purpose of which is to indicate to the service man how well he has mastered the correspondence course in which he is registered.

The second kind of examination is the General Educational Development battery, essentially a placement test. These examinations were prepared by the same staff, but under the supervision of Dr. E. F. Lindquist, professor of education, State University of Iowa. This placement battery has been developed for those students who would like to continue their education without worrying about specific academic credit. While it is true that high schools are granting diplomas on the basis of records on this battery, this test was intended to be used by the schools mainly to determine whether the returning veteran shall begin his educational training at the high school level, as a college freshman or as a college sophomore. This battery of examinations, which takes about eight hours for administration, includes interpretive reading exercises in the natural sciences and social sciences and on literary materials. In addition, the battery includes an English usage examination. At the high school level, it also contains a mathematics test. This battery is available for both the high school level and the college level.

A relatively high level of performance in all areas in the college examination would indicate that the student is probably capable of carrying college or university work at the sophomore level. The actual level must, in the final analysis, be interpreted by the institution itself, since, as will be explained later, there are wide differences in ability among the students of the various schools, and only the school itself understands the level of training that it offers and the kind of work that it expects of its own students.

The third kind of examination and the one that will be of particular interest to dental schools as well as to universities and colleges is the Subject or accreditation examination. Subject examinations have been built for more than thirty high school subjects and for more than forty college subjects. These examinations differ from the End-of-Course tests for, instead of covering only the objectives stressed in a particular correspondence course, they attempt to cover all of the objectives and aims of the courses generally offered under these titles by reputable high schools, colleges and universities. In fact, each of these Subject examinations has been prepared through cooperation with leaders in a particular academic field and with specialists in test construction. Therefore, each examination is probably much more representative of the courses being offered than any other single examination that is available. Herewith is a list of the subject examinations that have been completed.

In order to appreciate fully the value and usefulness of these examinations, one must recognize the amount of care and time that have gone into their preparation. A number of articles have been written by Dr. Tyler[1-4] and various members of his staff[5-11]. Other articles

1. Tyler, R. W.: Sound Credit for Military Experience. Ann. Am. Acad. Polit. & Soc. Sc. 231:58-64, January 1944.

2. Tyler, R. W.: Appraisal of Military Training and Experience. J. Am. A. Collegiate Registrars, July 1943, pp. 345-352.

3. Tyler, R. W.: College Credit for Men in Service. N. Central Assn. Quart., October 1943, p. 165.

4. Tyler, R. W., and Detchen, Lily: Evaluating Educational Growth During Military Service. Pub. Personnel Rev., April 1944, pp. 95-100.

5. Peterson, Shailer: United States Armed Forces Institute Field Examination in High School Biology. Am. Biol. Teacher 6:51-56, December 1943.

6. Petersen, Shailer: USAFI Examinations: Credits Toward Diplomas. Clearing House 19:18-22, September 1944.

7. Williams, Jay and Abraham, H. J.: Evaluating Course in Problems of Democracy. Social Ed. 9:167-172, April 1945.

8. Detchen, Lily: Appraisal of Military

High School Level

Elementary algebra
Second-year algebra
Advanced arithmetic
Solid geometry
Plane geometry

General biology
General chemistry
Meteorology
General physics
Radio (beginning)
General science
Senior science
French reading, grammar, vocabulary, at the lower level
French reading, grammar, vocabulary, at the upper level
American history
Civics
Problems of democracy
Modern European history
World history

Business English
Business arithmetic
First-year typewriting
Second-year typewriting
First-year Gregg shorthand
First-year bookkeeping and accounting
Second-year bookkeeping and accounting

Spanish reading, grammar, vocabulary, at lower level only
Italian reading, grammar, vocabulary, at lower level only
Mechanical drawing
Auto mechanics

English composition (grade 10, 11 or 12)
English reading and literary acquaintance (grade 10, 11 or 12)

College Level

Astronomy, introductory
General chemistry
Physical chemistry
Qualitative analysis
Quantitative analysis
Organic chemistry
Zoology
General biology
General botany
General physics

College algebra
Analytic geometry
Plane trigonometry
Differential calculus
Integral calculus
Economics
American history
Modern European history
American government
French reading, grammar, vocabulary at the lower level
French reading, grammar, vocabulary at the upper level

Engineering drawing
Surveying
Engineering mechanics
Aviation engines
Machine design
Diesel engineering
Electricity and magnetism
Electron tubes and circuits
Engineering electronics
Advanced engineering electronics
Fluid mechanics
Radio engineering
Advanced radio engineering
Strength of materials

Elementary psychology
Commercial correspondence
English composition
English reading and literary acquaintance

Spanish reading, grammar, vocabulary at the lower level only
Italian reading, grammar, vocabulary at the lower level only

have been prepared[12-23] by representatives of the accrediting agencies and others. These articles provide the reader with a description of the aims and objectives of this testing program and the use to which it will be put by the schools and accrediting associations. One article[6] has been published giving in some detail a description of the machinery by which these examinations have been produced.

In view of the fact that many of the sources of the previously mentioned articles may not be easily available to the readers of THE JOURNAL, it is probably well that a short description be given here of the examination building procedure. The examinations staff was selected on the basis of training and experience in academic fields as well as in the field of measurement and evaluation. While the entire staff functioned as a unit, having frequent group meetings and even more frequent informal discussions on technics, methods and devices to be employed, one or two people were usually assigned to the preparation of a particular examination. Professional consultants were then selected to assist in every way possible in the construction of the examination. These consultants were often designated by professional societies and some were selected by the staff and its administration on the basis of the individual's prominence in the field and his acceptance by the profession as an authority in the field. Three professional consultants were usually chosen and, in addition to these, many others were consulted informally from time to time. Every effort was made to include in these groups men in the field whose judgment would be respected. Also, an effort was made to include those with different views and ideas in order to keep the examination and its contents from being directed into a narrow channel, definitive of only a few kinds of courses.

The following outline summarizes the

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steps normally taken in the preparation of a Subject examination.

1. Selection of professional consultants to work with the examiners in preparation of the examination.

2. Agreement between consultants and examiners upon a general plan of approach for the development of the examination.

3. Preparation of a detailed list of objectives.

4. Agreement between consultants and examiners on the kinds of special abilities to be measured in the various subject areas; e.g., memorization of facts, application of principles, use of scientific method, interpretation of certain types of written material, etc.

5. Preparation of sample sets of examination items for the various objectives, from standpoint of both subject coverage and special abilities to be measured.

6. Agreement between consultants and examiners that sample sets of examination items seem satisfactory.

7. Construction of tryout form of examination (from 1.5 to 2.0 times the length of proposed final form).

8. Tryout form gone over by editorial staff.

9. Tryout form sent to all consultants for careful scrutiny and for suggestions, criticisms and comments.

10. Modification of tryout form in conformance with suggestions and criticisms of professional consultants.

11. Selection of classes throughout country where representative groups might be obtained for testing this tryout form of examnation.

12. Solicitation of cooperation from these proposed tryout groups.

13. Administration of examination to tryout groups.

14. Scoring of tryout examinations and gathering of data about students who took examinations.

15. Analysis of statistical data from tryout.

16. Modification of tryout form of examination in light of findings from tryout. Effort is made to select for final use only items that discriminate well between able and poor students and also to exclude those items that are easy for all as well as those that are difficult for even the superior students.

17. Preparation of two final forms of the examination. Form A is the secret form to be used by the armed forces, while Form B, which is comparable in every respect to Form A, is to be available to schools.

18. Checking of both forms by the editorial staff.

19. Submission of forms to professional consultants for scrutiny and for suggestions and comments.

20. Modification of both forms in light of suggestions and criticisms of consultants, but also with attention to performance data collected in the tryouts.

21. Standardization of the examinations by administration to large number of representative groups. These groups are from all parts of the nation and thereby make possible the preparation of national norms.

22. Equation of Form A with Form B so that schools will know what an armed forces examination score on Form A means in terms of the civilian form, Form B.

23. Distribution of Form A for administration by the United States Armed Forces Institute, Madison, Wis.

24. Distribution of Form B by the Cooperative Test Service of the American Council on Education, 15 Amsterdam Ave., New York, and by the Science Research Associates, 228 Wabash Ave., Chicago.

While only one form of the End-of-Course tests was usually prepared, two forms were prepared for each of the Subject Examinations and for each of the General Educational Development tests. A secret form is needed for the armed forces and the comparable form (Form B) is needed so that the high schools, universities and colleges may have a form that they can use in their own schools. By administering one form of the examinations in their own classes, the schools are able to determine what scores they may expect returning veterans to bring them if credit is to be granted. Form A will be released for use in the schools, as soon as the armed forces have completed their use of it.

The previous paragraphs have described the procedure employed for preparing the USAFI examinations. From

this, almost every one will agree that these examinations probably have a high degree of validity; i.e., measure what they are supposed to measure. While all schools should be able to make good use of the USAFI examinations, it is possible that the emphasis in some classes will be such that the examination scores will need careful interpretation. Nearly all of these examinations yield several scores, instead of one gross score. This profile of scores enables the teacher who is evaluating the work of a class on the USAFI examination, or the entrance officer who is giving credit on the basis of the armed forces grades, to interpret the set of several scores in the light of their importance at his own school. The use of part-scores is further described in a later paragraph. Comparisons have been made between the USAFI examination scores and the results of the school's own examinations. These comparisons also indicate that the USAFI examinations are valid measuring instruments.

Calculations of reliability on all of the examinations show this test statistic to be high. This indicates that the score the student receives would probably be nearly the same if he were to take the same examination again or if he were to take a comparable form of the examination.

In using the USAFI examination scores, one should be cognizant of the fact that each examination covers many more areas and objectives than are usually covered by a single, short examination that a teacher may have prepared for students in his own course. It is therefore reasonable to assume that few, if any, students could ever get a perfect score. This does not make the examination any less useful. In fact, it makes it much more useful; for the teacher, by using the USAFI examination, is actually giving the student an opportunity to reveal those special abilities and those bits of information that he may have acquired outside the course, but which are nevertheless important to his over-all view of the subject. One should not expect the USAFI examinations to yield scores whereby students fail because they are unable to answer 75 per cent of the questions. Many of the examinations have been so constructed that a score of 40 per cent may constitute a passing grade. On others, a passing mark may be as high as 60 per cent, but rarely does it go above that. Instructors and entrance officers who have not been familiar with examinations that are so comprehensive and relatively difficult as these will need to study the distributions of scores from various schools very carefully. If they do not, they are apt to interpret the scores incorrectly and as a result exclude good students from their school, thereby doing both the student and the school an injustice.

Those who are going to use the USAFI examination scores should also study the various part-scores that are available. Part-scores are important and valuable in any examination, but they are even more important when dealing with a comprehensive examination. For example, a returning veteran may in one subject bring a total score that is barely passing. One might find upon examining the part-scores that an unusually large number of these points were earned in a section of the test to which little or no attention is given at this school. This would mean that the student is actually doing failing work as regards those objectives which this particular school considers important, and it would therefore be wise to refuse the student credit even though his total gross score seems adequate. On the other hand, a student on the border line as far as his total score is concerned might be accepted if the school finds that he has done well on those parts of the examination that they consider most important.

As all school administrators and admissions officers realize, there is consid-

erable variation between the grades given at one institution for a certain caliber of work and the grades given by another institution for the same level of work. This is equivalent to saying that schools differ widely in the kinds of students that they have; in the level of performance that the school expects, and in the emphasis upon certain objectives of instruction. In view of these differences, it would not be fair for all schools to establish as a basis for entrance and credit the same level of achievement on the USAFI examinations. Some schools will wish to use the scores suggested by the national norms, while many other schools will decide that students whose scores are not quite that high will be acceptable. Still other schools will probably want to set the requirements even higher.

Each institution that expects to receive USAFI scores for accreditation purposes should establish a working set of critical scores. However, each institution should, as soon as possible, administer to its classes a sufficient number of the civilian forms of the examinations to establish a set of critical scores more representative of what it actually expects of its students. The deans and other admissions officers should have a copy of the handbook published by the American Council Committee on Accreditation, entitled "A Guide to the Evaluation of Educational Experiences in the Armed Services" and available from the American Council on Education, Washington 6, D. C. This handbook, which was prepared under the direction of George W. Tuttle, of the University of Illinois, includes a description of the types of educational opportunities available to the men. In regard to the subject examinations, titles of the courses which the examination might fit are provided, along with the amount of credit that could be allowed for satisfactory completion of the examination. It should be borne in mind that these are suggestions, and each institution will need to make its own decision. Some institutions, while having their own battery of examinations for handling their problems of accreditation, may still wish to equate the USAFI examinations in terms of their own test requirements. The majority of institutions have indicated a desire for accreditation suggestions and, as a result, the handbook has had partial financial support from nineteen educational associations.

Since more data are being gathered constantly on the USAFI examinations and their norms, it is well that the users of these scores keep in touch with the American Council on Education in order to receive all of the material that is prepared for release.

It is not difficult to understand that there will probably be many veterans wanting to enter dental schools with USAFI scores. Many of these will probably return to college or university for at least a short time, and this would make it unnecessary for the dental school to evaluate the USAFI scores. In these instances, the dental school could, for example, easily accept the chemistry or biology credit on the basis that the university or college had seen fit to accept it.

There may be cases in which the dental schools will be asked to evaluate these scores themselves. In many instances, this job of evaluating USAFI scores can still be delegated to the admissions officers of the university through which the dental school operates. In this way, the dental school would take the position that if the credits are acceptable to the departments in its own university, surely there is no reason why dentistry should not accept them.

Dentistry requires the equivalent of two years of college, which must include English, physics, inorganic chemistry, organic chemistry and biology. While there are five specific subjects for which scores must be presented, there is nothing to prevent the other courses from being a random collection of electives. These

electives may not always be representative of those courses that the usual two-year college student is required to take. It is possible that some veterans may request admission to dental school on the basis of USAFI scores in English, physics, inorganic chemistry, biology and four or five other subjects.

Shall veterans be admitted to dentistry on the basis of these USAFI scores in college subjects? Many will say "yes," but probably a few will be inclined to think "no." It seems reasonable that the veteran should at least be given credit for USAFI scores in the required courses. Furthermore, many institutions will be in favor of granting credit for elective courses that are considered related either to general education or to a general science education.

There are many good reasons for believing that the professional schools should honor these USAFI scores. For example, a test score describing the achievement in chemistry of a man in 1945 is a much more valuable index of his ability in that subject upon entrance than a C grade of another applicant who received that grade in 1940. Moreover, through USAFI scores, these abilities are described by a yardstick or measuring instrument that is the same for all applicants. No one should be critical of USAFI scores just because they are only test scores and do not appear to represent "expert" faculty judgment. These scores are from tests that are superior to many of those that have been on the commercial market and to many used in certain colleges and universities as a means of arriving at grades. In the preparation of these tests, the examination builders and the consultants have all been cognizant of the fact that they had been given the task of producing an instrument for measuring not just the memory, but also the application, reasoning and many other special abilities. These tests, while they may not measure all aspects of laboratory work directly, do measure most of those objectives for which laboratory work is supposedly offered.

Remember also that the returning soldier takes an examination that has been standardized on students enrolled in the most modern classrooms and laboratories. The exservice man may not have had formal drill on many of the facts and principles and he may have had entirely different laboratory conditions under which to learn chemistry, but, in spite of all this, he is being asked to present as good a passing mark as those students who are just completing their classroom and laboratory work. If the exservice man can earn a sufficient score on these examinations to make him appear as competent as today's students in school, it hardly seems possible that any one would not be eager to grant him academic credit.

SURGICAL PREVENTION OF "DRY SOCKET"*

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Most of the literature on "dry socket" has dealt principally with treatment of the condition. This article is written on the prevention of dry socket, in the belief that the condition is invariably due to failure to remove completely portions of the bony socket which have become sclerosed owing to an infectious process of long standing or to trauma, chronic or acute.

True dry socket results from a condensing osteitis. This statement is in contrast to the assertions that the condition is an osteomyelitis. Microscopically, the bone of a dry socket does not present a typical picture of osteomyelitis, showing a substitution of a condensing type of bone for normal bone, the result of a chronic inflammation, which has produced an infective hyperplasia, the result, in turn, of an invasion by bacteria. Bone hyperplasia may vary in extent, depending on the duration of the inflammation and the local resistance of the tissue. Condensing osteitis is characterized by the formation of new bone that is more dense and less regular in structure than normal. The consequent diminished blood supply is an important factor in the postoperative complication of dry socket.

In cases of dry socket produced by long continued trauma due to malocclusion, a similar picture presents itself, there being both an increase in density and a diminishing blood supply. In those cases resulting from acute surgical trauma, the bone is actually compressed, an artificial sclerosis and strangulation of the vessels resulting with consequent diminished circulation. The latter cause of dry socket differs from the two other causes in that the bone is not preoperatively infected by bacteria nor is it sclerosed. This is the type in which we find that a clot forms immediately after operation, but, having once formed, necroses and sloughs out, usually within forty-eight hours. It is likewise in this type of dry socket that portions of the socket wall may undergo sequestration, necessitating subsequent removal.

Dry socket is characterized by a dull ache which may, if caused by a long standing infectious process or by chronic occlusal trauma, become a deep boring pain. The patient may manifest low-grade infection or a toxic absorption. There may be considerable malaise. The pain is the result of irritation of the highly sensitized nerve endings in the bony walls of the socket, which is due to the inflammatory process.

Method of Prevention

The following method of prevention has proved most successful. The mucous membrane and the periosteum are retracted from the lateral cortical plate of bone for at least one half the length of the root. The lingual mucoperiosteum is retracted at least one third the distance. These flaps are retained in their retracted positions until the operation is completed, care being exercised to avoid any injury to them. Although this has little to do with the actual condition of dry socket, it is essential that the periosteum be well preserved so that the resultant bone regeneration may be as complete as possible. Regeneration of bone cannot be effected without a healthy, well ap-

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proximated periosteum. Too much stress cannot be placed on the absolute care of the periosteum in any operation where bone is involved.

After retraction of the soft tissues, the lateral cortical bone is removed for between one-third and one-half of the root length, while the lingual plate is removed for less than one-third the length. This can be accomplished only with small gouges and chisels. The distance will vary only if a remaining root is broken off beyond this extension and cannot be removed without further destruction of the plates. The lateral and lingual walls of bone should be alined on their crests with a lingual inclination so that a smooth continuity of the flaps and, eventually, a symmetrical ridge crest will result.

The tooth is next removed, care being taken to prevent fracture of the lateral and lingual cortical plates of bone. Owing to the previous removal of part of the bony plates, the danger of fracture of the root is minimized by careful manipulation.

After extraction of the tooth, an attempt is made to remove all sclerotic bone surrounding the socket. This is necessary because it is the presence of condensed bone that causes dry socket. The sclerotic bone is removed with small gouges, chisels and cutting osseous curets. It cannot be removed by curettage alone, and should be removed laterally, lingually, mesially, distally and apically. This is not difficult if the previous preparation of the cortical layers has been followed. In the event that this is not practicable because complete removal of the sclerotic bone would destroy the support of the approximating teeth and denude their roots or destroy the symmetry of the ridge, as much as possible should be removed in the same manner, and then the entire socket should be perforated in all its walls by a hand punch. The perforations should extend through the condensed layer into normal medullary bone. Needless to say, a bur should never be used to make these perforations because of the possibility of further bone damage by heat generation.

The socket is cleaned of bone débris and fragments, and the tissue flaps are brought together and measured for approximation. They are then trimmed so that the base of the approximated tissue lies on bone. By trimming the lingual flap first, the buccal can be brought to it and trimmed, the periosteal surface of the buccal flap lying on the crest of the lingual plate of bone and in direct continuity with the periosteum of the lingual flap. This method of approximation permits retention of the position of the flaps after suturing, thereby aiding in primary union of the flap ends. Only seldom will it be found that the base of the approximated tissue will not lie on the lingual crest.

Ordinarily, interrupted sutures, either silk or dermal, are placed without tension and left for from three to six days, the time depending on the resultant union. At no time should they be removed before there is union of the flaps, since they are retaining not only the mucous membrane, but the periosteum as well.

Conditions to which dry socket is frequently attributed include the removal of teeth in the presence of pus without proper postoperative dressing or care. Although this may lead to an active infection, it will be a quite different one from dry socket. The use of nonsterile instruments is also a factor and may likewise result in severe infection, but not dry socket. Probably the most common cause given is the early presence of saliva in the socket. This has proved to be of no serious consequence if circulation is established, and were it a cause of dry socket, a great many more cases would have this source. Other causes that may be discredited are exposure of the socket for any great length of time

during surgical work, the injection of adrenalin into the adjacent tissues and suction on, or placing the tongue in, the socket area. Dry socket will occur with the same incidence, regardless of the type of anesthesia employed. It will develop just as readily with general anesthesia as with any other kind, the anesthetic procedure having nothing to do with the condition whatsoever.

The higher incidence of a tendency to dry socket in elderly patients is understandable since the bone is more calcified and condensed in old age, with consequent diminished circulation.

Postoperative roentgenograms will show normal bone regeneration in areas operated on as outlined above. In fact, films made several months later will show in the socket area no difference from the adjacent bone. This is in marked contrast to the case in which just extraction was performed with no attempt to remove pathologic areas, the socket outline always remaining and the bone that has regenerated being of a porotic, undernourished type. This poor type of bone usually, sooner or later, causes trouble of one kind or other, despite the fact that the cause may never be suspected or discovered. In my experience, in many instances of chronically or recurrently tender areas under prosthetic appliances, sclerotic socket walls and their coexistent porotic content can be demonstrated. The patient may have many years of unnecessary suffering and never wear dentures satisfactorily. It is impossible to walk well with a sore foot regardless of how well the shoe fits.

It would be well if more thought were directed along the lines of prevention and less toward methods of palliative treatment with little regard to the retention of focal areas of infection. Failure to remove pathologic areas of bone completely cannot be offset by the placing of sedative or medicating packs in the wound. As an example, we have only to consider the practice of placing a sulfonamide drug in a dry socket. It is certain that such treatment will not eliminate areas of sclerotic bone. Assuming that any benefit, however slight, could be derived from the local use of a sulfa drug in a bony socket and particularly one without blood, it must still be remembered that although sulfonamide therapy is an adjunct to surgical procedures, it most certainly is not a substitute for them. The common use of medicaments that will temporarily alleviate pain, such as the guaiacol preparations, might be compared to the treatment of fever with phenacetin. The cause remains untouched.

In conclusion, too much stress cannot be placed on the necessity for good roentgenograms. In many cases, it is only through their medium that the possibility of dry socket can be recognized. With little effort, a careful evaluation of the roentgenographic and clinical findings can be made, and often a diagnosis of condensing osteitis can be established. When this condition is evident around the roots of teeth to be removed, the danger of dry socket should be recognized and every effort should be made to prevent its development.

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NOTES ON DENTURES, JACKETS, CROWNS AND BRIDGES

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Acrylics in one or more dental forms have been accepted by the profession as the answer to a long sought goal. While some properties may be lacking, it is, more than any other material, esthetically suited to dentistry. Whatever older material it has replaced, acrylic has served far better in naturally duplicating the appearance of lost dental structures. Its use in dentures alone is sufficient reason for its existence. Its further use in tooth structure replacement, as in jackets, crowns, pontics and teeth, has been one of the most interesting and widely discussed problems in present-day dentistry. As though to offset its many advantages, acrylics have been the recipient of more abuse and misinformation and suffered more unnecessary failure than all other materials combined. There are no experts on acrylics, and any one so self-styled is certain to disseminate wrong information. There are a few simple principles following which will eliminate 99 per cent of failure. It is the purpose of this paper to present the cause and correction of many common failures.

It is important to remember that, in acrylics, failure can seldom, if ever, be blamed upon the material itself. Doped monomers and plasticized polymers, in spite of their ultimate defects, are easier to work than pure dental methacrylates. The dentist or technician who asserts that one material is harder to work than another and so should not be used is not only admitting his own lack of knowledge on the subject, but also, in all probability, advising the use of an inferior material owing solely to the fact that it works, in utter disregard of sound acrylic procedure. It must not be inferred that a good material is difficult to work: it simply requires more rigid adherence to sound technic, with the knowledge that the ultimate gain is worth the effort. May I make an analogy to the ordinary amalgam filling? If we had never filled a tooth before, it would probably be easier to fill it badly than to fill it well. After practice in inserting only good amalgam fillings, we will admit that it is just as easy to make a good one as a bad one. The same is true with acrylics.

Denture failures, in order of frequency, are as follows: open bite, porosity, checked teeth, warping and bleaching. Open bite, except for the fact that many cases occur because of initially poor bites, occurs for three main reasons: 1. The waxed case may be invested with some wax on the occlusal surfaces of the teeth. During the boiling out process, these teeth are left poorly supported occlusally and, during subsequent packing and test packing, they are depressed into the investment. 2. Depression of the teeth in the investment may occur even when wax has not been left on the occlusal surface, if the case is packed and test packed before the investment is hard. It must be understood that the setting of the investment does not indicate that it is hardened.

Pressure of test packing will actually depress teeth into a set, but still soft investment. 3. Open bite occurs because of incomplete closure of the flask. Often, many cases are packed out of one large mix of denture material. The ones packed last are under extreme pressure, due to the stiffness of the mix, and occasionally the flask will not be entirely closed. The fact that presses contain spring clamps does not overcome this condition. In fact, it may aggravate the

condition. During initial expansion of the denture pack, the spring allows the flask to open and some denture material oozes out between the halves. Later, when contraction occurs, this remains as part of the flash, keeping open the halves during polymerization and thus opening the bite. It must be remembered that a 1 mm. opening in the second molar region will mean a 2 or 3 mm. opening at the incisal edge. It has been demonstrated time and time again in our laboratory that bites never need be opened if the original bite is perfect.

Porosity is the result of poor technic, never of poor material. It may be due to lack of compression or to poor time-heat conditions, or to a combination of the two. Porosity may be entirely eliminated by adherence to the following simple procedures: 1. Allow the powder and liquid mix to pass into the doughy state. 2. Test pack the case twice. 3. Process at 158 F. for the first hour and follow with one half hour boiling.

Checking of porcelain teeth has been largely eliminated by adherence to good time-heat conditions. Bringing the case slowly up to the boiling point is unscientific and uncontrollable. The heat should not go beyond 158 F. for the first hour.

Warping is caused by opening a case before it is completely cooled; or relining, rebasing and repairs may warp a case if not processed correctly. Recent experiments indicate that all repairs, rebases, etc., may be processed at 158 F. one hour only. Complete cooling should precede opening.

Bleaching is always the result of using "doped" denture monomer, in order to speed the setting time of commercial molding powder. A good denture material never changes color. Before dentures are inserted in the mouth, the ridge and palate area should be carefully inspected for tiny nodules. Many will be found on each case, causing mucosal irritation. The laboratory technician seldom touches this area.

Processing failures in jackets, crowns and bridges are rare owing to the fact that the restoration is not extensive. The processing temperature may be decreased to 158 F. for one-half hour followed by one-half hour's boiling. All cases should be completely cooled before opening. The main problem in restorative acrylics is shade. Entirely too much reliance has been placed on duplicating porcelain shade guides—the cause of shade failure in many instances. Acrylic prostheses will match natural teeth far better than porcelain shade guides. The use of a porcelain shade guide is a handicap to the technician, which can be overcome by the use of an acrylic shade guide and of materials requiring little or no formulation that are directly matched to the shade guide one is using.

There are two main technics for blending acrylic jackets, crowns and bridges. The dry-pack involves placing the dry powder in the mold, both gingival and incisal, and carefully adding the monomer. The opposite technic involves mixing a gingival and an incisal dough and applying them in their proper positions. A combination of the two is perhaps the simplest and most accurate technic. The gingival mold is dough packed completely, then the incisal region is cut away and the incisal powder added dry and then carefully wet with the monomer. This allows of complete shade control and blending, with the advantages of both technics.

The cementation of acrylic jackets has perhaps caused more consternation than all other problems. We have the choice of two types, opaque and translucent, and they can be used with equal success. We must not rely upon cementation alone. Shoulderless preparations, tapering preparations and preparations allowing inadequate bulk of acrylic material predispose to failure in cementation. The preparation of the abutment is of paramount importance and the area should always present at least two oppos-

ing parallel walls. These offer mechanical resistance to failure in cementation. All preparations should permit of adequate mechanical retention, to allow the prosthesis to be worn without cementation. The cementing operation itself is important. The jacket should be prepared by roughening the inside surface, if it has been processed on foil. The jacket should be sterilized, but not with alcohol. Zephiran chloride is a safe antiseptic for this purpose. The cement should be well mixed, not thin, and in the sticky stage during placement. Crowns should be seated by the use of an orangewood stick and horn mallet used with discretion.

The following facts must be remembered: Dental cement will not stick to a smooth surface. Dental cement does not cement by ultimate stickiness. Dental cement only cements by flowing into microscopic irregularities in the tooth and the restoration area, causing a mechanical resistance to sliding dislodgment. If dislodgment is prevented by initial mechanical retention due to the presence of two opposing parallel walls, the cement will hold indefinitely. In this respect, the preparation area should not present a smooth polished surface. All preparations should be finished with a coarse carborundum paper disk.

Many failures in bridgework are due to the nature of the attachment and not to the weakness of the acrylic material. No reinforcing structure is necessary in routine jackets, crowns or bridges of two units or under. Reinforcing these cases tends to weaken rather than to strengthen. Where parallel opposing walls are not obtainable, gold thimbles can be used, cut out on the labial aspect so that they present no shade problem. Attachments in acrylic bridgework have three purposes only: (1) to attach the acrylic pontics to the gold abutments; (2) to hold the pontic rigid and to prevent its rotation, and (3) to attach two or more gold abutments. The commonest cause of failure is the use of large reinforcing bars, which detract from the strength of the acrylic pontics, causing them to break off. Thin cast double bars embedded in the gingival half of the pontic are best. If pontics are extremely thin, a complete saddle type of attachment is necessary. These attachments can be made in a saddle and post of such type that the acrylic pontic can be replaced if it ever breaks. Failure of attachments is mainly the result of too much bulk, poor welding or soldering, poor placement in the pontic or the use of weak acrylic material or of base metal bars or some commercial wrought gold bars that flex.

Camouflaging the bars so that their presence does not alter the shade seems to be a major problem. These bars should be thin and embedded in the gingival half of the tooth, where their presence does not alter the shade. The use of opaquing materials that come in liquid form is not recommended, as they invariably contain solvents that are definitely harmful and weakening to acrylic materials.

Discoloration of the jacket crown or bridge has occasionally been reported. There are four definite causes. If they are finished on amalgam dies and some amalgam is polished into the material, jackets will always stain dark, especially around the gingival aspect. Ill-fitting crowns often become stained at the gingival region owing to the cement's dissolving out, with resultant food débris penetration. Occasionally, jackets are cemented with germicidal "kryptex." This causes an eventual distinct grayish cast. Alcohol or solvent sterilization is to be condemned as it frequently causes prostheses to become whitened. There is no reason that jacket crowns or bridges should become stained if they are made of good material and these precautions are observed.

Solvent contact with acrylic prostheses, teeth or dentures is to be avoided. The

use of solvents in the form of alcohol, acetone, chloroform, cleaning fluids, wax solvents, etc., frequently causes initial or ultimate checking of the plastic. These checks appear as crazed or cracked areas. Any such crazing or checking is the result of solvent contact. It is not safe to use solvents on the investment before processing, as the solvents are absorbed by the investment and are not always completely eliminated before processing. Later, processing drives the solvents out, into contact with the plastic. Checking or crazing does not always occur immediately and may appear days, weeks or months later. Water-soluble wax solvents such as sal soda and borax are harmless, safe and efficient, if the water is kept clear of wax.

Acrylic inlays should be confined to one surface cavities such as approximal Class III, gingival and cervical Class V and occlusal Class I. Two surface cavity inlays should be attempted only when appearance is more important than permanence. As in stump preparations, all inlay preparations should have at least two opposing parallel walls for mechanical retention. Gingival locks are especially important in Class II cavities, preventing spreading of the gingival part of the inlay. The same rules for cementing jackets and crowns apply to inlay cementation.

The foregoing rules, technics and procedures have brought unqualified success to the use of acrylics for more than four years.

The majority of jackets, crowns, inlays and bridges placed at that time are now in routine use, with no evidence of early failure. It is true that some acrylic jackets and bridges have worn down. It is equally true that many more porcelain prostheses of similar use have in that time fractured. Although, at the present time, there is no improved plastic material to replace acrylics in dentistry, it may be assumed that stronger, harder combinations of the organic and inorganic materials may be forthcoming. Meanwhile, sound simple acrylic procedures may be relied upon to give us the utmost in dental efficiency with present-day acrylics.

Thirty-Second and Spring Garden Streets.

POSTWAR PLANS OF DENTISTS IN SERVICE: V. INTEREST IN SALARIED EMPLOYMENT*

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This paper, the last of the current series, proposes to consider the interest among dental officers in postwar opportunities other than those afforded by private practice. The Postwar Planning Questionnaire of the American Dental Association, from which these findings come, covered the following broad types of positions: teaching; industrial, state and local public health, and, with the Federal Government, Army, Navy, Public Health Service, and Veterans Administration.

Traditionally, the dentist has always

*Previous papers: Camalier, C. W., and Altman, Isidore: Postwar Plans of Dentists in Service: I. General Findings. J.A.D.A. 32: 568, May 1, 1945; II. Plans for Additional Training. Ibid. 32:692, June 1, 1945; III. Private Practice. Ibid. 32:803, July 1, 1945; IV. Special Aspects of Private Practice. Ibid. 32:1013, August 1, 1945.

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put his skill and training into application in his own private office. Salaried positions, except as part-time projects, have never attracted many; as witness the fact that of 7,549 officers who replied to the questionnaire, only 383 (5.1 per cent) had held full-time positions before the war. Many of these had been in the regular corps of the Army and Navy, and in the Veterans Administration as civil service employes. As the data will show, the number of dental officers favorably disposed toward offers of full-time positions is significantly higher than 5 per cent, although it remains true that the great majority of the dentists in service will ultimately enter or return to private practice.

Since more than 90 per cent of the dentists in active service on October 1, 1944 expressed an intention to take up private practice, it is necessary to remark at the outset that many men who said they were entering private practice also indicated an interest in one or more of the full-time positions. It was noted in the third paper of the series, which dealt with aspects of private practice, that 11 per cent of the men are willing to remain in service, 4 per cent would take

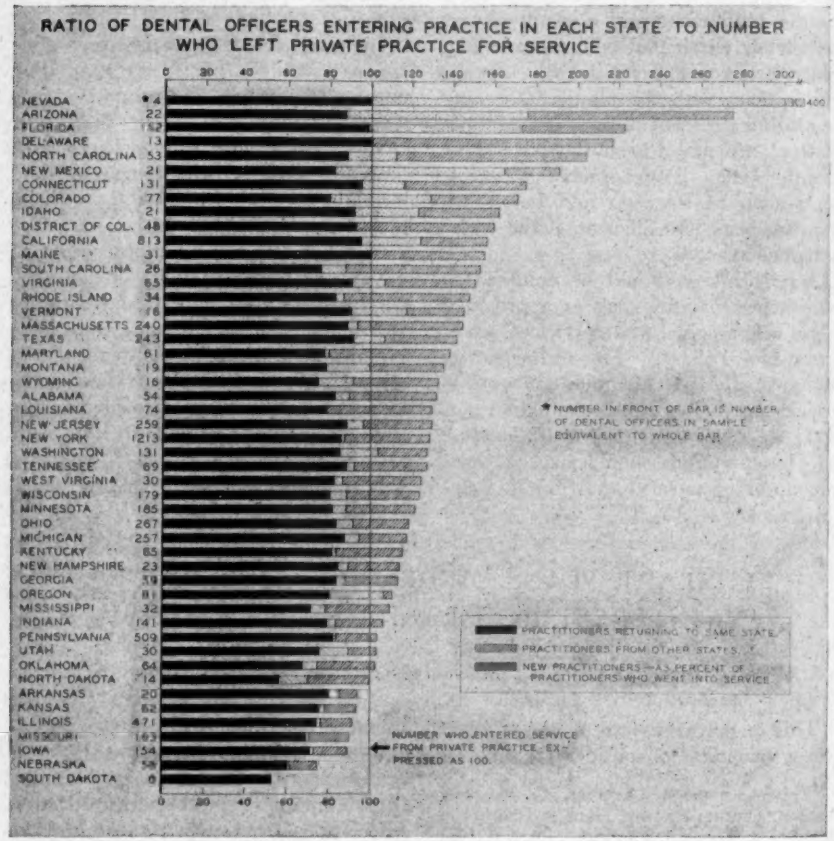

Table 1.—Percentage of Dental Officers Planning to Teach

Plan to Teach	All Dental Officers	Status Prior to Active Service		
		A Private Practice	B Dental School or Internship	C Salaried Position
Yes	6.9	6.6	7.6	8.3
Undecided	1.0	0.8	1.3	1.3
No	86.2	86.9	84.9	82.8
No answer	5.9	5.7	6.2	7.6
Total	100.0	100.0	100.0	100.0
Number of dental officers	7,549	5,495	1,671	383

a full-time position in industry and 5 per cent are interested in both; that is, 16 per cent of those interested in returning to practice might forego private practice for Federal Government service and 9 per cent would accept satisfactory positions in industry.

The findings of the survey with respect to full-time positions will be taken up in the order in which the items appeared on the questionnaire, the questions being restated at the head of the appropriate sections. But first a word about the general character of the data.

Source of the Data

These data are based on a questionnaire that was directed to the more than 21,000 dental officers in service by the War Service and Postwar Planning Committee of the American Dental Association, with the cooperation of the chiefs of the respective dental services. The questionnaire itself was reproduced in full in the first paper, "General Findings." Most of the officers received their questionnaires in September and October 1944 and, by January 1, 1945, 7,549, more than one-third of the men, had completed and returned them. These 7,549 replies are the foundation of the present reports.

As to the representative character of the data, it was shown in the first paper that the officers who replied to the questionnaire and the entire dental-officer population corresponded so closely in distribution by age, branch of service and place of origin that generalizations about the entire group from the findings of the sample could be employed with some confidence.

For purposes of analysis, the dental officers who replied will again, as they were in previous papers, be divided in three groups: Group A, dentists who entered service from private practice; Group B, new graduates who came directly from dental school or an internship, and Group C, those who had held full-time salaried positions before entering service.

Teaching

The questions were:

21. Do you plan to teach? Yes_____. No._____.

22. Specify field of teaching_____.

The questionnaire could not, of course, delve into the matter of qualifications for teaching, although its importance cannot be overstated; but a desire to teach is the prime essential to effective teaching. In the company of dental officers who plan to teach after the war, there are sure to be found many who will prove extremely capable instructors.

A summary of the replies to question 21 is shown in Table 1. Of all who replied to the questionnaire, 7 per cent

Table 2.—Age Distribution of Dental Officers Planning to Teach

Age in Years	Percentage Distribution of Dental Officers	
	Planning to Teach	Replying to Questionnaire
Under 30	37.1	31.8
30-34	25.8	27.6
35-39	21.2	25.3
40-49	13.2	12.7
50 and over	2.7	2.6
Total	100.0	100.0
Number of dental officers	598	7,549

answered question 21 in the affirmative and an additional 1 per cent expressed some degree of interest. Differences among Groups A, B and C are small and not very significant, although the highest percentage planning to teach is to be found in Group C, the men who came from full-time salaried positions. In this connection, one must note that the question did not distinguish between full-time and part-time positions. Since the former are still so few, faculties today being largely staffed with active practitioners, it is safe to assume that most of the men who plan to teach intend doing so on a part-time basis. Yet there must be a substantial number who would make a career of teaching. There is a growing awareness of dental education as a profession, and of its importance to the complete training of practitioners.

The percentages shown in Table 1, if they are applicable to the entire dental-officer population, imply that there are more than 1,500 would-be instructors now in service. For the thirty-nine dental schools in the country, these figures mean an average of forty men per school. The schools, from all evidence, will be preoccupied with both an increase in undergraduate enrollment, and an influx of dental officers seeking refresher and graduate courses. Here is an excellent source to be tapped for the necessary teachers.

Distribution by age of those who plan to teach reveals that interest is greatest among the youngest men. As Table 2 shows, 37 per cent of those who plan to teach are under 30 years of age, as compared with 32 per cent of the entire group replying to the questionnaire. Two reasons come to mind. The first is the felt need for a part-time position to supplement a novitiate practice. The second, which is perhaps the more important, is the desire to combine teaching with research or with postgraduate education.

Courses that or fields in which the men plan to teach are shown in Table 3, in order of numerical importance. About a fifth of those interested in teaching failed to specify the subject matter. (The table assumes that these men are distributed in the same way as those who did supply such information; hence, the percentages are higher than the ones shown in the paper "General Findings," where they were calculated by dividing the number specifying each subject by the total interested in teaching.)

The subjects checked most frequently were oral surgery (36 per cent), prosthetic dentistry (21 per cent), operative dentistry (16 per cent) and orthodontia (9 per cent). The order approximates that of the courses of training that the men hope to pursue on separation from service. The subject most often designated as the one in which the men will seek additional training was oral surgery, with prosthetic dentistry second, crown and bridge third and orthodontia

Table 3.—Percentage of Dental Officers Planning to Teach Who Checked Specified Fields

Field of Teaching	Percentage of Dental Officers	Field of Teaching	Percentage of Dental Officers*
Oral surgery	36.1	Anatomy	3.1
Prosthetic dentistry	21.3	Children's dentistry	2.9
Operative	15.9	X-ray	2.5
Orthodontia	8.8	Public health	2.5
Crown-bridge	7.1	Anesthesia	2.3
Periodontia	4.4	Oral diagnosis	2.1
Pathology and histology	4.2	Oral medicine	1.0

*The percentages are based on the 7.9 per cent of all officers replying to the questionnaire who are willing to teach. (See Table 1.)

fourth. Thus, we have in the several dental fields something in the nature of supply meeting demand. This parallelism gives strong indication that these are the fields in which the men feel that more training is necessary. Furthermore, the findings may point in the directions in which the men believe that research is needed, since it is now well recognized that real teaching and research go hand in hand.

In addition to the subjects shown in the table, there were a number of courses that were checked by just one or two men. Among these were dental economics and office management, dental materials and materia medica.

Positions in Industry

The questions took the following form:

23. Would you take a position as a dentist in industry? Yes_____. No_____.

24. If so, full-time_____. Part-time_____.

Dentists in industry are, relatively speaking, newcomers. The realization of the dentist's potential contribution to employe efficiency in plants and factories has grown rather slowly, although some programs of dental service have been in operation for several years. These services vary from examinations and recommendations to complete care not only for the employe, but for his dependents as well.

That the expansion of employe health programs, to which the war has given impetus, will bring increased employment of dentists, as dentists are released from service and are willing to accept such positions, cannot be doubted. The U. S. Public Health Service has recommended that plants of 500 or more employes have a full-time dentist and has suggested that smaller plants employ a part-time dentist or, collectively perhaps, a full-time dentist.[1] The work can be done in the private office of the dentist.

The replies to the questionnaire signify the availability after the war of a large group of former dental officers interested in industrial dentistry. As Table 4 shows, 27 per cent of all who returned questionnaires expressed definite willingness to accept a position in industry and another 4 per cent indicated that they would perhaps accept such employment. Nine per cent specified that they would accept a full-time position and 17 per cent only a part-time one. A small percentage failed to differentiate between full-time and part-time employment.

It is to be observed that Group C shows the highest percentage willing to accept full-time positions, Group B the lowest. On the other hand, 22 per cent of the men in Group B checked a part-time position in industry as compared

1. Division of Industrial Hygiene, National Institute of Health, U. S. Public Health Service: Manual of Industrial Hygiene. Philadelphia: W. B. Saunders Company, 1943, ch. 6: Dental Services.

Table 4.—Percentage of Dental Officers Who Would Take Position in Industry

Kind of Position	All Dental Officers	Status Prior to Active Service		
		A Private Practice	B Dental School or Internship	C Salaried Position
Full-time position	8.9	9.5	5.9	14.1
Part-time position	17.3	16.4	22.0	9.1
Full-time or part-time not specified	0.5	0.5	0.4	1.0
Undecided	4.4	4.8	3.5	2.7
Would not take position	63.9	64.0	63.5	62.7
No answer	5.0	4.8	4.7	10.4
Total	100.0	100.0	100.0	100.0
Number of dental officers	7,549	5,495	1,671	383

with 16 per cent in Group A and 9 per cent in Group C. Again, the most likely reason is the beginning practitioner's need of a part-time job to help him establish himself. In addition, these percentages are signs that the men recognize the developments in industrial dentistry mentioned above.

Apparently few of the men now in service have had previous experience in the field of industrial dentistry. Of the men in Group A who expressed an interest in such positions, only 8 per cent had held part-time positions in industry prior to entering service. In Group C, where all the officers had come from full-time positions, only 4 per cent of those interested had held a position in industry —additional evidence of how limited this field has been in the past.

Position in Public Health

Public health was covered in item 25, as follows:

25. Would you take a position in a state or local health department, school clinic, etc.? Yes_____ No_____ If so (specify)_____.

Health departments, both state and local, have steadily been adding dental service to their functions. The first state to establish a dental unit was North Carolina, in 1918. By 1943, forty-four states had created dental units in their health departments. Twenty of the forty-four go beyond educational programs and provide clinic services as well, such services being limited generally to children and selected groups of the population.[2] Legislation now pending in Congress calling for expanded dental health programs and research and the recent organization of a permanent dental health section in the American Public Health Association are among the evidences of a marked growth in public health dentistry after the war. That the dental officer is not unaware of these trends is shown in the high percentage who evinced interest in public health employment.

Most of these men at present look to public health dentistry for part-time employment only; for 90 per cent of all the officers who checked "Yes" on this question also stated that they were entering private practice. Public health as a subject for postwar training was checked in less than 4 per cent of the replies to the questionnaire.

The data in Table 5 summarize the interest in public health employment. Twenty-nine per cent of all who returned

2. Morrey, L. W.: Growth of Public Health Dentistry. M. Care 3:38, February 1943.

questionnaires would accept a position of this kind, and another 4 per cent indicated that they might possibly do so. Thus, almost a third of all the men could be said to show an interest in public health programs.

Again, the highest percentage of officers interested in a salaried position were in Group B. In this group, the percentage was 42, as compared with 30 in Group A and 27 in Group C; and, although a likely reason is the need for a part-time position as a useful adjunct to new practice, this fact does not discount the trend toward greater interest in the field of public health.

61 per cent of this group specified school clinic—a position most apt to be part-time—and only 11 per cent specified a state health department, where a high percentage of the positions are ordinarily full-time. On the other hand, almost half the men in Group C who specified kind of position chose the state health department. The number in this group is small, but the percentage is noteworthy.

By age group, it is found that of all those interested in such positions, 38 per cent were under 30 years of age (as of October 1, 1944); whereas, of the entire group who replied to the questionnaire,

Table 5.—Percentage of Dental Officers Who Would Take Position in a State or Local Health Department, School Clinic, Etc.

Position in a State or Local Health Department, Etc.	All Dental Officers	Status Prior to Active Service		
		A Private Practice	B Dental School or Internship	C Salaried Position
Would accept position	28.9	27.2	35.5	24.5
Undecided	3.6	2.6	6.9	2.9
Would not accept position	58.6	60.0	54.3	59.0
No answer	8.9	10.2	3.3	13.6
Total	100.0	100.0	100.0	100.0
Number of dental officers	7,549	5,495	1,671	383

More than half the men who might accept such positions either did not make a specific choice of position or indicated that any of the positions mentioned could prove acceptable. Of those who made an election, almost half wrote in "school clinic." The choice of most of the remainder was about evenly divided between state and local health departments. That only 4 per cent specified a position in a hospital is due largely to the fact that hospitals were not specifically mentioned in question 25. How many would have checked it otherwise is unascertainable.

In connection with what was said about Group B, it will be observed that 32 per cent were in this age group. These figures are influenced by the high percentage of new graduates (Group B) who answered in the affirmative; but, even in Group A, the tendency to show interest in such positions was stronger in the younger men.

Government Service

This point was covered by items 26 and 27 of the questionnaire, as follows:

26. Do you desire to remain in Government service? Yes_____. No_____.

27. If so, Army_____. Navy_____. U.S.P.H.S._____. Veterans Administration_____.

Table 7 summarizes the replies to

question 26. Evidently, one man in five now in service desires to remain after the war or is willing to be persuaded to do so; how many will actually remain is, of course, a question, much depending on the eventual size of the armed forces and the ultimate decision of the men. The percentages for the entire group are influenced, though to slight extent, by the high percentage in Group C who expect to remain in service. Half of this group consisted of men who, before the war, were in the regular corps of the services or were employes of the Veterans Administration. The number in Group C is small, and it is on the other and Navy after the war, with compulsory military training.

Statistics for each service are presented in Table 8. The table shows in detail the percentage checking each branch of service, alone or in combination with the others, except that Army and Navy have been merged for some of these combinations. In this table, the men who indicated indecision, but specified a branch of service have been combined with those who answered in the affirmative. By and large, the men who would remain on active duty prefer their own branch of service and, when some other corps is acceptable, it is only as

Table 6.—Percentage Distribution of Dental Officers Interested in Public Health Positions According to Place of Employment

Place of Employment	All Interested Officers	Status Prior to Active Service		
		A Private Practice	B Dental School or Internship	C Salaried Position
State health department	25.2	29.7	11.3	46.1
Local health department	24.4	24.7	23.7	23.1
School clinic	46.4	41.8	61.0	23.1
Hospital	4.0	3.8	4.0	7.7
Total	100.0	100.0	100.0	100.0
Number of dental officers giving information	969	656	274	39

groups that attention should be centered.

Extremely interesting is the difference in sentiment voiced by the officers in Groups A and B, the relative number in the former expressing an interest in postwar federal service being almost twice that in the latter. We could speculate on the reluctance of former practitioners to start practice over again, the eagerness of the new graduate and young officer to improve his economic status, etc., but that is better left to others. Nevertheless, the data hold significance for the armed forces themselves, in the sense that they imply a failure on the part of the service to attract and hold the younger men. The problem may become serious should there be a large standing Army a second choice. That a high percentage of Army officers are willing to accept positions in the Veterans Administration may be partly due to the possibility that some of the officers in the latter agency identified themselves as Army officers and were thus tabulated. On the other hand, many Army officers may have taken cognizance of the inevitable large scale expansion of the Veterans Administration after the war and the consequent urgent need that agency will have for dentists.

It is remarkable that the Army and Navy differ by only one point in the percentages desiring to remain in service. The officers of the latter show less interest in other agencies. The Public

Health Service has a higher percentage of officers who would continue in service, which is understandable in view of its activities. The Public Health Service would tend even in wartime to attract dentists interested in seeking careers in fields like public and industrial health, men who would stay on if they could when war activities have ceased.

A study of the officers in Group A by age bears out the intimation above that the older men are the ones who prefer to stay in service. Of the men who would stay, almost 40 per cent are 40 years old or older. Among the remainder, less than 15 per cent are in this age group. Only 7 per cent of the former are under 30, in contrast to the 17 per cent under 30 among the latter. Each individual has his own reactions to life in service and his own reasons for his choice of a future, yet these add to a phenomenon common to the group. There must be something about private practice and about government service that makes the younger men wish to get out of the latter and the older men to stay in. We might hazard a guess as to some of the reasons, but perhaps more definitive information should first be at hand.

Table 7.—Percentage of Dental Officers Who Desire to Remain in Service

Reply to Question	All Dental Officers	Status Prior to Active Service		
		A Private Practice	B Dental School or Internship	C Salaried Position
Desire to remain in service	15.2	14.7	7.1	58.5
Undecided	4.9	5.4	3.6	4.4
Do not desire to remain in service	77.1	76.9	86.8	35.8
No answer	2.8	3.0	2.5	1.3
Total	100.0	100.0	100.0	100.0
Number of dental officers	7,549	5,495	1,671	383

Geographic Division and Interest in Various Kinds of Employment

It is always interesting, and not infrequently of some importance, to examine such data as we have here for sectional delineations. Table 10 has been prepared to show the percentages of former practitioners (Group A) in each geographic division who expressed willingness to accept, or at least displayed some interest in, the kinds of employment that have been discussed. The reason for limiting the table to Group A is that the state of origin is most reliable for this group. New graduates and men who entered service could not answer the questionnaire item on community of practice, on which the sorting of the officers' replies by geographic section is based. From the distribution of the men by activity prior to service, it is evident that Group A makes up 73 per cent of the total number of officers who replied to the questionnaire.

The general impression from the table is that there is little association between the positions as a whole and the geographic division. This is true. Only between positions in industry and employment in public health is there a high correlation when the divisions are ranked by size of percentage. There is also a fair degree of association between planning to teach and interest in a public health position.

Sectional differences in the percentage of dental officers who plan to teach cover

Table 8.—Percentage Distribution of Dental Officers in Each Branch of Service According to Desire to Stay in Government Service

Reply and Branch of Service Checked	Dental Officers in			
	Army	Navy	Public Health Service	Veterans Administration
Desire to remain in service:				
Army	6.8	0.1	....	1.3
Navy	....‡	13.9	....	....
Public Health Service	1.1	.4	22.0	....
Veterans Administration	4.6	1.1	....	73.4
Army or Navy	....‡	....	....	....
Army-Navy or Public Health Service	0.4	0.1	0.5	....
Army-Navy or Veterans Administration	2.5	0.9	....	16.4
Public Health Service or Veterans Administration	1.6	0.3	3.3	1.3
Army-Navy, Public Health Service or Veterans Administration	0.8	0.4	....	1.3
Undecided (No branch specified)*	1.6	1.2	2.2	2.5
Do not desire to remain in service	77.8	78.8	67.6	3.8
No answer	2.8	2.8	4.4	....
Total	100.0	100.0	100.0	100.0
Number of dental officers†	5,096	2,191	182	79

*When a branch of service was specified, the reply was in this table tabulated with those expressing a definite desire to remain in service.

†Total is 7,548 since branch of service could not be determined for one officer (his answer to the question was no).

‡Less than 0.05 per cent.

a wide range, varying from 11 per cent in the New England States to 0.1 per cent in the Mountain States. The reason for the low percentage in some areas is not far to seek. Significant to any plan for teaching is the presence of a dental school or proximity to it. Thus, 93 per cent of the men in Group A who plan to teach practiced formerly in states containing dental schools. Most of the remainder came from states like New Jersey and Connecticut, small states from which dental schools can be easily reached.

It would seem natural, in the instance of industrial positions, to anticipate association with the degree of industrialization of the geographic section; but this does not seem to be the case. While the highest percentage interested in such positions is to be found in the Middle Atlantic States (41 per cent), the West North Central States (33 per cent) are second and the West South Central States (28 per cent) fourth in order of percentage. Lowest in order are the Pacific States, the section in which a high degree of industrialization has taken place in recent years.

The sections of the country whose former practitioners are most interested in a position in a state or local health department or school clinic are the four in the northeastern and north central parts of the country. These are the New England, Middle Atlantic and East and West North Central States. This suggests an association of such interest with the degree of industrial development and the evolution of the health department in these sections. It is not unlikely that the men who replied to the questionnaire have an awareness of the possibilities in the various fields of employment, which is reflected in the percentages.

As for regional variations in the desire to remain in service, the percentages reflect the economic status of the areas

Table 9.—Age Comparison of Former Practitioners Who Do and Do Not Desire to Remain in Service

Age (in Years)	Percentage Distribution of Former Practitioners	
	Desiring to Remain in Service	Not Desiring to Remain in Service
Under 30	6.8	17.2
30-34	23.5	36.2
35-39	33.0	33.1
40-49	30.0	12.5
50 and over	6.7	1.0
Total	100.0	100.0

and differences in the penchant for military life. Thus, the West North Central States show the highest percentage desiring to remain in military service (30), followed by the Mountain (28), the West South Central (27) and the East South Central States (26). Lowest percentages are to be found in the Pacific and New England States (14 and 13).

Summary

Findings of the Postwar Planning Questionnaire of the American Dental Association relative to salaried employment in four different fields may be summarized as follows:

1. *Teaching.* — Seven per cent said they plan to teach and an additional 1 per cent indicated that they might or would like to teach. The percentage decreases with increase in age. The fields of teaching most frequently specified were oral surgery (by 36 per cent of those planning to teach), operative dentistry (by 16 per cent) and orthodontia (by 9 per cent).

2. *Industry.*—Willingness to accept a position in industry was expressed in 27 per cent of the replies. An additional 4 per cent indicated that they were undecided on this point. The ratio of those who would accept only part-time positions to those who would take full-time positions was about 2:1. In Group B, the new graduates, the ratio was almost 4:1.

3. *State or Local Health Department, School Clinic, Etc.*—Twenty-nine per cent would take such positions and an additional 4 per cent were undecided. In Group B, 42 per cent said that they would or might, as compared with 30 per cent in Group A. The place of employment that most men preferred was the school clinic. The officers were not asked to distinguish between full-time and part-time positions. The evidence is that relatively few would take full-time employment.

4. *Government Service.*—Fifteen per cent of all who replied averred that they desired to remain in service after the war, and 5 per cent had not made up their minds in this respect. The percentage who answered in the affirmative, plus the undecided, was 20 in Group A, 11 in Group B and 63 in Group C. The percentage who would stay in service was 19 in the Army and 18 in the Navy. On the whole, the men clearly indicated that the preferred branch of service was the one that they were in now. Analysis by age showed that the percentage desiring to remain increased with age.

5. Differences by geographic division in the proportion of men who would accept full-time employment were worthy of note, although there was little association among the various kinds of employment except between positions in industry and those in public health.

Conclusion

It has been plain throughout these reports that the great majority of dental officers now in service intend to return to private practice. Less than one man in ten is definite in his decision *not* to take up private practice, and this includes all those who are in the regular corps or who came into service from full-time employment. There are many who, while they feel that in all probability they will ultimately wind up in practice, are amenable to offers of full-

Table 10.—Percentage of Former Practitioners (Group A) in Each Geographic Division Who Expressed Interest in Specified Kinds of Employment

Geographic Division	Percentage of Former Practitioners					
	Planning to Teach	Willing to Take Position in Industry			Willing to Take Public Health Position	Desiring to Remain in Service
		Full-Time	Part-Time	Total		
New England	11.4	5.4	22.5	27.9	39.0	13.3
Middle Atlantic	9.2	10.7	30.3	41.0	43.6	18.6
East North Central	7.2	10.4	20.7	31.1	26.4	20.0
West North Central	4.6	14.8	18.2	33.0	26.2	30.1
South Atlantic	7.1	8.4	11.6	20.0	15.8	13.9
East South Central	6.1	8.3	12.2	20.5	15.0	26.1
West South Central	4.5	10.3	17.7	28.0	20.3	26.7
Mountain	0.1	12.8	14.3	27.1	23.3	27.8
Pacific	8.2	3.5	14.2	17.7	17.6	14.1

time employment in industry or in government. Others would welcome part-time employment, as an adjunct to practice and a service to the public. Each kind of employment—in industry, in public health and in the Army and Navy—was shown to interest a sizable group, although these groups overlap and are not to be added together. The chances are that opportunities in the various fields will not go begging for want of takers.

Paralleling this growth of interest in salaried employment is the development of opportunity for such employment. This report has pointed out the increasing recognition of dental teaching as a whole-time career, the progressive evolution of industrial and public health dentistry and the need for dentists in the armed forces, should they remain of considerable size, and in the veterans' facilities.

Is the profession of dentistry on the verge of change in the traditional modes of practice? On the basis of the survey's findings, we could hardly substantiate such a statement. By and large, the returning dentist-veteran will go into private practice. Nevertheless, there is a significant difference in the percentage of dentists who entered service from salaried employment and the percentage of dental officers who would accept such employment on separation from service. At any rate, these findings can be considered as trends. They contain much for the profession to contemplate and study.

A Note on Item 33: "List the Important Ways in Which the American Dental Association Can Aid the Returning Dental Officer"

The volume of inquiry that has been received on this question signifies a great deal of interest in it. Coverage of the questionnaire would be incomplete without a statement on what the officers had to say about aid on their return. Every man, of course, has his own mode of expressing himself, and his view of a subject will differ from that of his fellow, however slightly. A certain amount of liberty had to be taken in interpretation, therefore, in fitting all the different statements into a practicable number of categories; but such "editing" was kept to a minimum.

The suggestions that occurred most frequently, and the percentage of officers who made them, are shown in Table 11. About a quarter of the replies failed to contain any suggestions at all. An additional fifth contained a variety of sug-

Table 11.—Summary of Replies to Questionnaire Item 33: "List Important Ways in Which American Dental Association Can Aid Returning Dental Officer"

Suggestion	Percentage Who Mentioned This Item*
Provision of refresher courses	26.2
Removal or easing of licensure requirements for returning dental officers	21.1
Direct sale of surplus equipment to returning dental officers	17.1
Information on suitable locations	15.1
Opposition to socialized dentistry	10.8
Loans to returning dental officers	10.7
Immediate discharge for older dental officers	8.0
Enforcement of dental ethics	3.1
Expansion of dental education of public	2.8
Other remarks	20.8
No suggestions	25.7

*Based on 867 questionnaires, 10 per cent of all replies received by May 15, 1945. The percentages do not add to 100, since many officers had more than one suggestion to offer.

gestions, none of which occurred often enough to make an impression statistically, although many have a worth while sound. Among these are: job lists for men who do not wish to return to private practice, social security for dentists, state society clinics and advisory committees for those who have never been in practice.

As the table shows, more than a quarter of the replies urged the provision of refresher courses. This, it is to be noted, was in addition to the four items of the questionnaire that covered the respondent's own plans for additional training after discharge from service, and indicates how important the men consider such courses to be. A fifth of the men would like to see licensure requirements lowered on behalf of the returning dental officer and veteran. It was observed, while the tabulations were in process, that not all the men making this suggestion were themselves considering a change of state.

The next two suggestions, referring to direct sale of surplus equipment and information on suitable locations, and the suggestion of loans to returning dentists, i.e. making them readily obtainable, show that many men need and want help in returning to practice. (It may be that the "G.I. Bill of Rights" will largely answer this need.) It can hardly be doubted that the men were speaking for themselves as well as for their fellow officers.

The admonition to the Association to combat "socialized dentistry" appeared in one questionnnaire in ten. Precisely what was meant by this term is not clear, but it undoubtedly refers to a compulsory or regimented system such as exists in certain other countries. Further inquiry may be warranted to obtain a more definite image of the men's sentiment in this respect.

The succinct expression in the table, "Expansion of dental education of public," covers perhaps a wider range of statements by the officers than any of the other items. Some stressed the need to make the public aware of the dentist and his services. Others mentioned the importance of warning the public against quacks and charlatans. In general, the idea seemed to be that dentistry should assume a greater part of the responsibility for public education in the meaning of good dental service, nutrition and personal hygiene.

In summary: Three-fourths of the dental officers who replied to the questionnaire responded to the request for

an expression of ways in which the Association can aid the returning dentist veteran. Some went to great lengths to express their views. The nine items mentioned most often are shown in Table 11, but the significance of the several suggestions ought not to be measured by the frequency with which they occurred. All are important. Certainly, they are important to the men who may quite soon be returning to private life. Many of the suggestions that the men made involve problems which they will be facing directly and on which they very deservedly should have all the help that the American Dental Association can give them. A few of the replies were skeptical about the Association's doing anything; but most of the responses bespoke a confidence in the Association's efforts in their behalf in connection with the many intricate problems presented during and following this most destructive of all wars.

While this discussion has revolved around answers to item 33 of the questionnaire given by the men in the service on or before January 1, 1945, it seems pertinent to bring the data up to the present by referring to recent correspondence from the men, inspired, no doubt, by the termination of the war in Europe. The prime interest of the men overseas, particularly in the European theater of operations, is to ascertain whether they will be released from service or be given an opportunity for assignment in the continental United States, permitting other dentists with no overseas service to take their places in the units being sent to the Pacific.

Considerable feeling has developed from the fact that many of the men are apparently being redeployed to the Pacific, via the United States, by assignment of their military commanders in the European and Mediterranean theaters of operation, with little prospect that the Office of the Surgeon General in Washington will be able to interfere with such arrangements.

The arguments on the side of the military are briefly that the men have been well trained under combat conditions and work well with their units, and that it would be a detriment to the war effort to exchange them for new and untried material. The arguments on the side of the men are that they have conscientiously served their country in their theaters of operation and were trained after they were commissioned, and they see no reason why the same conditions should not apply to dentists domiciled in the United States, especially the recent graduates.

The men are also concerned about the release, to return to their civilian communities, of dentists in the United States who have not themselves had overseas service. Overseas men naturally feel that, where two or more individuals are being considered for return to civilian practice in a given community, priority should go to the dentist who has had the longest overseas service.

SULFANILAMIDE SPRAY FOR DENTAL UNITS

A. D. Alexander, D.D.S., Williamsburg, Va.*

A simple and quickly assembled sulfanilamide powder blower for dental units is here illustrated. The total assemblage is made from standard stock found in all blood chemistry laboratories. The necessary materials are (1) a glass test tube 25 by 150 mm. ("popsicle tube"); (2) a rubber stopper No. 5, with two holes bored; (3) glass tubing three-sixteenths inch in diameter, and rubber tubing three-sixteenths inch, inside measurement.

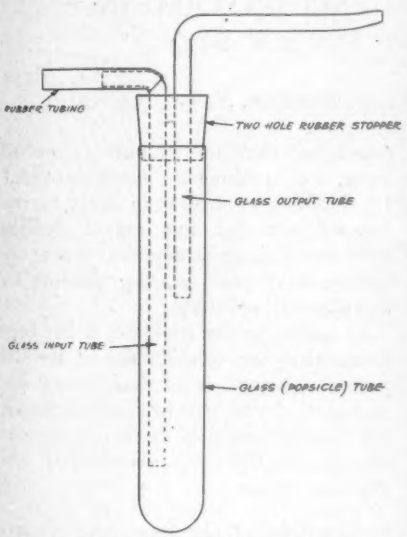

Fig. 1.—Assembled apparatus. For best results, the tube is about half filled, the sulfanilamide level being kept below the output tube.

As shown, the glass tubing is bent so that the input tube reaches almost to the bottom of the test tube. The output tube is about midway from the bottom of the test tube. Its tip is tapered by "drawing out" in the flame. The air nozzle clip of the unit will engage the rubber tubing, thereby holding the blower securely.

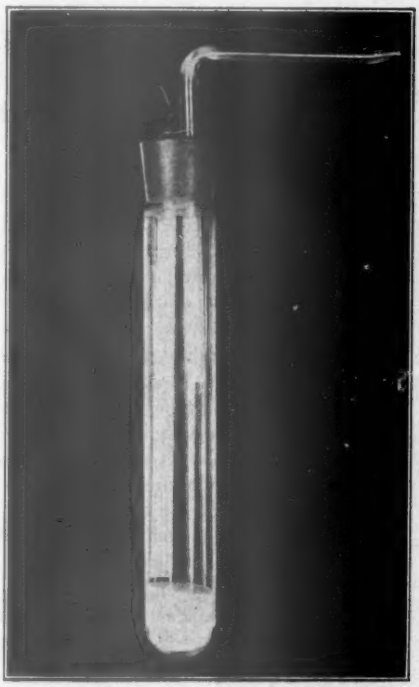

Fig. 2.—Apparatus. Sulfanilamide crystals are seen in the bottom of the tube.

A heavy deposit or a fine "frosting" of sulfanilamide powder can be delivered at will. Control is effected by regulation of the air pressure allowed to pass through the test tube.

Since sulfanilamide is not a self-steri-

*Lieutenant Commander (DC) USNR.

lizing drug and is easily contaminated, this is an easy and clean method of handling the powder. It facilitates the placement of sulfanilamide crystals in the alveolar sockets after extraction. As an adjunct to the routine and accepted medicaments now in vogue, sulfanilamide may be found helpful in the treatment of Vincent's Infection, pericoronitis, gingivitis, and gingivostomatitis. I employ the sulfanilamide spray routinely after curettage.

[The opinions or assertions herein contained are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.]

Camp Peary.

A SCIENTIFIC APPROACH TO THE SOLUTION OF PRACTICAL PROBLEMS ENCOUNTERED IN ELECTROFORMING COPPER DIES

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It has been repeatedly stated in dental literature that electroformed copper dies are far superior to dies made by any other process now employed in dentistry.[1-6] Nevertheless, many dental practitioners, after spending relatively large sums for commercial electroforming machines and much valuable time, have discarded the process as impractical.

Experience has shown that one of the chief difficulties encountered is the unequal distribution of the copper deposits over the impression surface, which has manifested itself in (1) bare, uncovered areas, (2) prolonged "covering time," (3) inability to deposit in deep, narrow recesses and (4) fine cuspal deposits with heavy gingival deposits, which, obviously, have poor wearing qualities for finishing and polishing.

In analyzing the problem, it has been found that the conductivity of the impression surface is of paramount importance. Important in lesser degree are the similarly grouped factors of primary current distribution, polarization and throwing power.

Conductivity of the Impression Surface

An understanding of two fundamental laws of physics is essential. The first of these is Faraday's Law, the basic law governing all electrolysis, which may be expressed as follows:

1. The quantity of any element (or radical) liberated at either the anode or the cathode during electrolysis is proportional to the quantity of electricity that passes through the solution.

2. The quantities of the different elements liberated by the same quantity of electricity are proportional to their equivalent weights. A corollary to the

1. Asher, H. H.: Galvanoplasty in Dentistry. D. Digest, 42:300, September 1936.
2. Bender, I. B.: Method and Advantages in Constructing Simple Dry Cell Battery Machine in Electroplating Dental Dies. D. Items Int., 59:70, January 1937.
3. Irving, A. J.: Electroforming Indirect Inlay Models. D. Items Int., 57:596, July 1935.
4. Tuckfield, W. J.: Electroforming for Dental Purposes. New Zealand D. J., 33:83, March 1937.
5. Tuckfield, W. J.: Principles and Technique of Electrodeposition as Applied to Dental Practice. Austral. J. Dent., 42:6, January 1938.
6. Viverito, J. A., and Damino, John: Electroplating in Dentistry—Applied to Inlay Dies. D. Cosmos, 77:1202, December 1935.

first statement is that the quantity of any element deposited at any point on the cathode is proportional to the current flowing through the solution to that particular point on the cathode. Since, in acid copper plating baths, no hydrogen is evolved at the current densities ordinarily used, the entire deposit being copper, it may be stated that the amount of copper deposited (the thickness of the shell) depends on the amount of current. If different portions of the cathode surface have different amounts of current flowing through them, we may expect different amounts of copper to be deposited; i.e., inequality in the current (according to the formula above).

It is important to remember certain facts about resistance:

1. Resistance does not vary with variable amounts of current.

2. The resistance of a conductor depends on the material. Silver is the best metallic conductor of an electric current, followed, in order, by copper, gold and tungsten, with graphite well down on the list.

3. The resistance of a conductor varies inversely with the cross sectional area (the thinner the conductor, the greater the resistance).

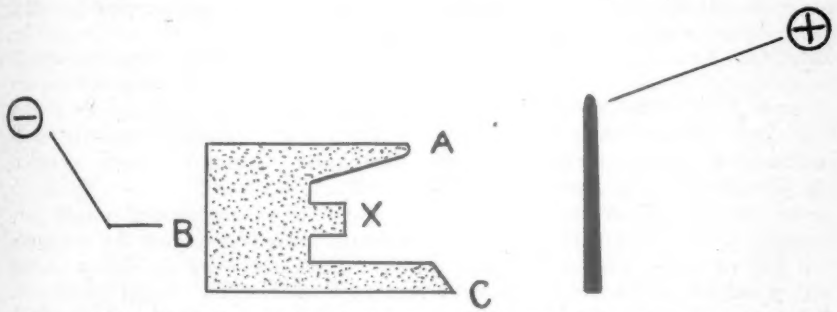

Fig. 1.—Schematic representation of section through copper band impression connected with cathode lead-in wire and copper anode.

thickness of the deposit. It seems obvious, therefore, that to insure immediate equal deposition of copper over the entire surface of the impression, we must provide for an even amount of current to pass over the entire cathode surface (or impression).

Ohm's Law may be stated as follows: The current in a circuit is directly proportional to the electromotive force and inversely proportional to the resistance of the circuit; simply, $I=E/R$, or amperes = volts/ohms. A corollary of Ohm's Law is the Law of Divided Circuits: When a current divides, part flowing in one branch, the rest in another, the branch containing the smaller resistance will carry the larger part of the

4. The resistance of a conductor is directly proportional to its length.

With these basic physical principles in mind, we may analyze the problem as it pertains to dental practice. In the usual dental procedure, we have a compound impression in a copper band; the impression surface of the compound is covered with fine graphite (or copper bronze powder with oil to make it adhere) and the band insulated at all points except where it is connected to the cathode holder and at the gingival edge.

The current flowing from the anode to the cathode, obviously, is governed by the applied EMF (voltage) and the resistance of the copper sulfate bath.

However, we are interested in the actual current flowing across the graphite film.

From Figure 1, we can see that the law of divided circuits applies. From point *A*, the current may be considered to divide into one component going directly to *B* through the copper band and another crossing the graphite film to *C* and thence to *B*. We have as many shunts as there are points on the periphery of the copper band (gingivally). We may also consider the impression surface as a whole and see that the current at point *X* flowing to *B* depends on the resistance it meets to reach *B*, etc. The relative amount of current flowing directly through the copper band and across the graphite film will depend on their respective resistance in accordance with Ohm's Law.

Experimentation

In order to determine the relative resistance of various materials as applied to dental electroforming, the following simple experiments were performed.

A No. 10 copper band was connected with a cathode holder and immersed exactly one-half its length in the copper plating bath. The voltage of the apparatus was adjusted so that 50 milliamperes of current passed through the solution. The voltage remained constant for all subsequent tests so that only differences in the resistance of the materials tested caused differences in current strength (Ohm's Law).

Several cylinders of compound, paraffin and conductive impression wax were prepared with the same outside dimensions as the No. 10 copper band. These cylinders were attached to cathode holders and covered with various films, immersed separately exactly one-half their length in the plating bath and ammeter readings taken.

Copper band .....50 MA
Compound cylinder 0
Paraffin cylinder 0
Conductive impression wax...46 MA
Compound cylinder covered with film of metallizing graphite (Hanau)..2 MA
Compound cylinder covered with film of oil and metallizing powder (Hanau) (copper bronze) 0
Paraffin cylinder covered with Hanau copper powder dry .....4 MA
Compound cylinder covered with silver mirror .....48 MA
Paraffin covered with silverized copper powder .....47 MA
Conductive impression wax covered with silver mirror .....52 MA
Conductive impression wax covered with "oxidized" graphite film....20 MA
Conductive impression wax covered with "oxidized" copper powder (no oil), 48 MA.
Compound covered with "oxidized" copper film (oil used to make copper bronze adhere) .....10 MA
Conductive impression material covered with silverized copper powder, 50 MA.

From the experimental results obtained, it may be seen that the resistance of the copper band is approximately equal to that of the conductive impression wax and that of the silver mirror film or the silverized dry copper powder in the approximate relative thickness employed in dental technic.

We may assume, therefore, with reasonable accuracy, that an impression taken with the conductive impression wax in a copper band, the impression surface covered with dry pure copper electrolytic dust, subsequently silverized and attached to the cathode holder, offers a conductive surface which receives equal strength of current at all points, other factors being equal. Immediate equal coverage of the impression surface by the deposited copper is to be expected and a copper shell of practically even thickness may be obtained in a relatively short time. Practical experience in more than 800 cases has borne this out.

The choice of the use, in practice, of the silverized copper powder film instead of the silver mirror technic is based upon purely practical considerations.

Interpretation of Results

1. The resistance of a fine graphite film is extremely high, and it is doubtful whether appreciable current is conducted along it when a good conductor (copper band) is adjacent. Coverage of graphite film results from gradual additions of deposited copper adjacent to the band, which gradually covers the surface, thus building up conductivity over the impression area.

2. The use of oil to make copper bronze powder stick to compound greatly interferes with the conducting properties of the copper. Coverage occurs as with the graphite film.

3. The conducting properties of impression wax in the thickness used in filling a No. 10 copper band is almost equal to that of the copper band.

4. A thin film of metallic silver offers conducting qualities that are almost as good as that of a copper band.

5. The presence of oil interferes with the conductive qualities of a silver film as it does with copper.

6. "Oxidizing" by copper deposition through the use of iron filings definitely increases conduction by graphite or dry copper powder, probably by offering a continuous metallic surface.

7. The combined resistance of the chemical silver mirror film and the conductive impression wax, as used, is somewhat less than the resistance of the copper band.

8. The combined resistance of the silverized copper powder film and the conductive impression wax, as used, equals that of the copper band.

Technics and Materials Used

1. *Conductive Impression Wax.*—For some time, I have experimented in an effort to produce an impression material that will conduct an electric current. The incorporation of colloidal graphite, pure copper powder and pure silver powder in various impression materials and waxes was tried. For more than a year, I have used paraffin with a melting point of 52-54 C. and graphite (No. 38) in the proportions of 60 per cent graphite and 40 per cent paraffin by weight as advocated by Thompson,[7] who clearly stated the advantages of the impression material and its physical characteristics as determined by standard measuring instruments. In the proportions advocated, the paraffin acts as a binder for the colloidal graphite and its use assures softening under heat.

I have found the material far superior to compound as regards accuracy and reproduction of detail. Owing to the crystalline nature of colloidal graphite, the material will not become distorted when pulled away from undercuts, but will break at the point of undercutting without an effect on the remaining impression. The lubricating property of graphite eliminates the need of an intermediate lubricant.

The following experiment was performed to attest to the accuracy of the impression material.

A complex mesioclusodistolingual inlay preparation was made in an "ivorine" tooth, a direct wax pattern made and the inlay cast. Two indirect impressions were taken of the "ivorine" tooth with the conductive impression material and copper dies electroformed. An indirect impression was then taken of one of the two electroformed dies, with the same impression material, and another electroformed die was made. The direct cast, as it was removed from the investment mold, was seen to fit the three electroformed dies as well as the original tooth. An attempt to repeat this procedure using compound as an impression material did not have the same results.

7. Thompson, G. E.: Technic of Electroforming Dies. Apollonian 16:62, April 1941.

2. *Silver Mirror Technic.*—As has been stated previously,[8] the silver mirror technic cannot be used on modeling compound, since silver compounds react unfavorably with the compound. This has not been the case in my experience. The following solutions are employed:

A. Sensitizing solution	
Stannous chloride	1 gm.
Concentrated hydrochloride	1.5 cc.
Distilled water	3 cc.
Pure tin reagent metal	0.5 gm.
B. Silver solution	
Silver nitrate	420 mg.
Distilled water	9 cc.
C. Reducing solution	
Pyrogallic acid	100 mg.
Citric acid	21 mg.
Distilled water	3 cc.

To 10 cc. of distilled water is added 10 drops of sensitizing solution, and this is dropped on the compound with a medicine dropper. The impression is then washed in 10 cc. of distilled water and immersed in the silver solution. Over the immersed impression is poured the reducing solution and the entire contents is agitated by means of a medicine dropper for three or four minutes. The impression is then washed.

Examination will show that the entire surface is covered with a thin film of silver. All exposed copper band must be covered with wax before treatment with the solutions and the silver deposited on the wax wiped off, leaving only the film on the compound. Copper plating will be immediate and even, but the exactness of the technic required, the time and the danger of staining clothes and fingers are disadvantages. For these reasons, the silverized copper powder film is preferred. The solutions are excellent for silver nitrate treatment of teeth.

(Only a trace of stannous chloride is necessary to "sensitize" the surface for the production and adherence of the silver film. Since stannous chloride solutions are unstable and are readily oxidized to the stannic form, a reagent solution of stannous chloride is prepared with hydrochloric acid and water and tin reagent metal placed in the solution. Obviously, there may be objection to the use of a strong hydrochloric acid solution on the teeth. Therefore, the following technic is advocated. To 10 drops of distilled water in a dappen dish, 1 drop of the sensitizing solution is added. This reduces the acid concentration from an approximate 25 per cent by volume to an approximate 2.3 per cent. The surface of the tooth to receive the silver film is wiped with a minute quantity of this dilute solution on a pledget of cotton and then wiped off with a cotton pellet saturated with distilled water. No appreciable acid remains on the tooth, as can be demonstrated when a silver nitrate solution is applied. If any free acid remains, the chlorine ion will precipitate silver chloride from the silver nitrate solution. This does not occur. After application of the sensitizer, silver nitrate is applied to the area, being followed by the reducer in the usual manner.

A saturated solution of silver nitrate is preferred to the solution of silver nitrate given above when used on a tooth.)

3. *Silverizing Pure Copper Powder.*—Chemically pure copper electrolytic dust requires no intermediate material to make it adhere to conductive impression wax. A small quantity is placed on a fine camel's hair brush and brushed over the entire impression surface. A strong blast of air removes all excess. The silverizing solution has the following formula:

Silver cyanide, 4.4 troy ounces to the gallon.

Potassium cyanide, 7 ounces to the gallon.

Potassium carbonate, 5 ounces to the gallon.

Distilled water as a solvent.

A small quantity of this solution is taken in a medicine dropper and forcibly ejected over the copperized surface. The

8. Irving, A. J., reference 3, p. 577.

result is the immediate formation of a white film of silver (plating by immersion). Any spots that remain dry are readily detected and the solution once more directed to these areas. The silver solution may be used over again many times. The silverized film must be thoroughly washed in tap water before immersion in the acid copper bath.

an acid copper bath diluted with an equal volume of water. Pure fine iron filings are sprinkled over the graphite. Iron goes into solution, copper precipitating over graphite. The compound is washed thoroughly.

5. *Oxidized Copper.*—The treatment of oxidized copper is the same as that for oxidized graphite.

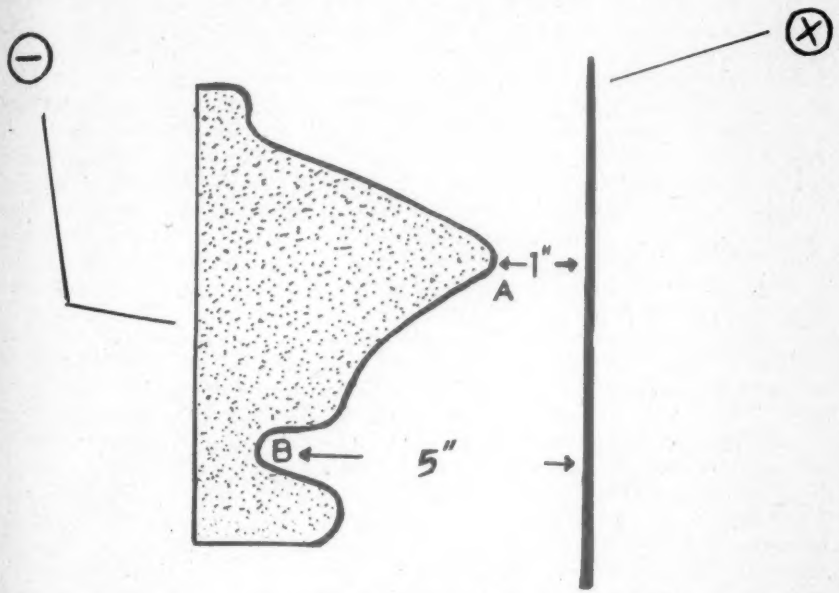

Fig. 2.—Schematic representation of section through irregular metal cathode and copper anode.

The advantages of this technic other than that of conduction are:

1. Finest impression detail is reproduced, since the metal film becomes an integral part of the model, in contrast to the use of graphite.

2. The silver film allows ready separation of plated copper from copper band.

3. Air bubbles are prevented by thorough preliminary wetting of the surface. With the silverized film, we have a visual check.

4. *Oxidized Graphite.*—Compound covered by graphite film is immersed in

Control of Factors Other Than Conduction of the Surface of the Cathode in the Equality of Thickness of the Deposits

In dental electroforming, as was pointed out, the periphery of the impression (copper band), being more conductive than the impression itself and directly connected to the cathode holder, "robs" the current from the impression surface and thus causes inequality in distribution of the deposited copper. How this can be eliminated by altering the technic and materials heretofore used has been shown. There are other

factors in the current density or strength of the current at different points of the cathode.

If an irregularly shaped metal cathode with deep recesses and sharp projections were copper plated, the thickest deposits would be found at points nearer the anode and the thinner deposits in deep recesses. Those parts nearer the anode receive higher current densities, in accordance with Ohm's Law; but here the variable is the resistance of the solution rather than the unequal resistivity of parts of the cathode.

If point *A* (Fig. 2) on the cathode were 1 inch and point *B* 5 inches from the anode, the resistance of the copper bath from anode to *B* would be 5 times as great as to *A* and, with the same potential (voltage), the current strength at *B* would be one-fifth that at *A*. The distribution of the current to the cathode, depending entirely on the shape and position of the equally conducting cathode, is called the "primary current distribution."

This primary current distribution is altered when there is "polarization" at the cathode, which tends to increase "throwing power," the improvement in percentage of the metal distribution ratio above the primary current distribution ratio. In other words, at point *B*, we should have a deposit one-fifth the thickness of that at point *A;* but owing to "polarization," the distribution actually may be found to be 4 to 1 instead of 5 to 1, or the throwing power of the solution is +20 per cent. In the case just cited, the solution at point *A* would tend to be more rapidly depleted in copper ions than at point *B* since more copper is being withdrawn from the solution and deposited at point *A*. A greater voltage is required to deposit copper from a dilute than from a concentrated solution so the effect is a countervoltage at point *A*, which reduces the relative strength of the current at this point; i. e., a concentration polarization has been produced. Usually, this polarization is greater for high than for low currents, making the current density at the near point less than if there were no polarization. The secondary current density so produced is more nearly uniform than the primary distribution. Therefore, those conditions that increase polarization at the cathode will tend to give more uniform deposits. The composition of the plating bath determines to the greatest extent the degree of polarization at the cathode.

In experiments performed at the Bureau of Standards,[9] several factors in throwing power were evident: 1. Increasing the current strength, in general, increases throwing power, but, with some solutions, particularly an acid copper bath, greatly increased currents decrease throwing power. 2. An elevation in temperature decreases throwing power. 3. Moderate agitation is advantageous in preventing collection of the solution in deep recesses, but rapid stirring with air decreased throwing power. 4. Using stronger solutions decreases throwing power by increasing the available supply of copper ions. Weaker solutions show better throwing qualities. Increasing the acidity markedly increases throwing power. Since acid is gradually used up, it is necessary for this as well as other reasons to add small amounts of sulfuric acid to solutions periodically. 6. Addition of colloidal substances (addition agents) such as dextrin, gelatin or glue in small quantities markedly increases throwing power by causing greater polarization at the cathode.

The primary current distribution of the equally conductive cathode may be improved by: 1. Having all impressions an equal distance from the anode when electroforming many dies at once. 2. Increasing the distance from anode to cathode, thus making relative distances to near and far points more nearly equal. An ideal tank for dental purposes is an old battery case that allows an anode-

cathode distance of from 8 to 10 inches. At this distance, the several millimeters from depth of impression to gingival portion of band assumes negligible significance.

3. Shielding the projecting portions of the band with the rim of wax that insulates the outer surface of the band. It should extend 1.5 to 3 mm. above the gingival portion of the band and be bent in.

4. Use of solutions (*a*) with good conduction (a small quantity of acid should be added to the bath periodically); (*b*) that are not too concentrated (small amounts of distilled water should be added to the bath occasionally to make up for the loss of evaporation); (*c*) incorporating addition agents (the best is one drop of glue to a gallon of solution, added every month), and (*d*) with slight agitation.

Factors in the Character of the Deposits

The chief object is, first, to obtain an equal distribution of the copper, and, secondly, to obtain fine deposits. The finer the deposited crystals, the brighter, harder, smoother and stronger the deposit.

Bancroft[9] has laid down several axioms regarding the structure of electrodeposited metals:

1. Unsatisfactory deposits are due to excessive admixtures of some compounds or to the presence of large crystals.

2. Excessive admixtures of any compound can be eliminated by changing the conditions so that the compound cannot be precipitated.

3. Increasing current density, increasing the potential difference at the cathodes or lowering the temperature decreases the size of the crystals.

4. Crystal size is decreased when there are substances (addition agents) present at the cathode surface that are adsorbed by the deposited material.

5. A given solution that will assure a satisfactory deposit at any current density will give more satisfactory deposit at a higher current density provided conditions at the cathode surface are kept constant.

6. "Treeing" is facilitated by a high potential drop through the solution and by conditions favorable to the formation of large crystals.

In experiments performed at the Bureau of Standards,[9] using normal copper sulfate and tenth normal sulfuric acid solution, depositing on flat copper cathodes to equal thicknesses, the following factors were seen to influence the size of the crystals.

1. Up to a certain point, finer grained crystals are obtained by increased current density. Beyond this optimum, treed or arboreal deposits are obtained, especially on corners. If the current is still further increased, powdery or burnt deposits containing some basic salt of copper are obtained. This precipitation is due to increase of pH of the cathode film with the current. The entire sequence is due to impoverishment of metal and metal ions and increased polarization.

2. If there is local impoverishment of ions, agitation or the use of more concentrated solutions with higher current densities will assure smaller deposits. The effect of agitation is more pronounced in dilute solutions.

3. Lowering the temperature decreases crystal size. Increasing temperature decreases cathode polarization (reduces throwing power) and increases crystal size. The temperature effect is more marked than any other. Copper deposited at 77 F. had a tensile strength of 40,000 pounds per square inch; at 104 F. only 2,000 pounds per square inch, and the deposits were softer and abraded much more easily.

4. At a given current density, the con-

9. Blum, William, and Hogaboom, G. B.: Principles of Electroplating and Electroforming. Ed. 2. New York: McGraw-Hill Book Co., 1930.

ductivity governs the potential drop through the solution. Conducting solutions reduce the tendency to form trees or rough deposits.

5. Solutions rich in metal ions favor the growth of few large crystals; with few ions available at a given time, fine grained deposits. We may therefore use dilute solutions, use solutions with few free ions but more available (as in cyanide solutions with high polarization effect) or use higher currents.

6. Colloids, such as glue, gelatin and albumin, to have effect must migrate to the cathode where they are adsorbed by the deposited metal. The presence of colloids hinders normal growth of crystals, makes edges of individual crystals more convex and results in a much finer grained deposit. On the other hand, suspended metal, carbon, etc., may lodge on the cathode to form a nucleus for large crystals. For this reason, solutions are filtered periodically. The use of additional agents tends to counteract the effect of suspended particles and their results are not so marked when used with filtered solutions.

Summary and Recommendations

An impression is taken in the usual fashion using graphite-paraffin conductive impression material. In my experience, the minutest detail will be reproduced with extreme accuracy with this impression material. After a copper wire is twisted around the band to secure it, chemically pure copper electrolytic dust is brushed over the surface of the impression and the excess is blown away. Except over the impression surface, baseplate wax is used to insulate all the band and the wire lead in. The wax is allowed to extend several millimeters beyond the gingival rim of the band and bent slightly toward the impression surface. A small quantity of the silverizing solution is forcibly ejected over the copperized surface with a medicine dropper until the surface turns completely white.

The impression is then thoroughly washed in tap water and immersed in the plating bath and contact made by means of the wire lead in with the negative bus bar. The current is adjusted to the maximum amount that will not cause powdery deposits, while the agitation apparatus (either the tube connecting with the compressed air outlet or a mechanical stirrer driven by air) is adjusted to give slight agitation. The current can then be increased (an average size impression in a proper bath may safely receive 300-400 milliamperes with agitation). In two hours, a sufficient shell has formed. Artificial stone or Mellotte's metal is used to build up the root portion in the usual fashion. The impression or impressions should be from 8 to 10 inches from the anode and 1 gallon of the solution should be used in the tank. Each month, 1 drop of glue, a few cubic centimeters of sulfuric acid and several ounces of distilled water should be added to the solution, the amount depending on how often it is used, rate of evaporation, etc. The plating tank should be placed in a cool place. The apparatus should have a voltmeter connected with it to determine potential drop through the solution. When it increases markedly and is not lowered sufficiently by the addition of acid and water, or if after such addition the anode becomes covered with a brown precipitate necessitating markedly increased voltages to give the same current, the solution should be renewed.

In this paper, much description of apparatus and details of technic has been avoided. If the fundamental principles of electroforming are understood and the problems encountered are properly analyzed, a technic evolves that will give uniformly excellent results with a minimum of effort.

510 Ocean Avenue.

THE EFFECTS OF DIETARY DEFICIENCIES UPON THE ORAL STRUCTURES. III

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FURTHER TESTIMONY FROM HEARINGS ON DENTAL RESEARCH AND GRANTS-IN-AID BILLS. II

DR. PARRAN (continuing): I should like to insert in the record a detailed list of the several types of studies which we have carried out, and would point out at this time that these studies have been concerned primarily with the problem of mottled enamel and of dental caries. (See the Surgeon-General's formal statement). . . .

Some substantial additions to previous information have been uncovered, particularly in the relation of the amount of fluorine in the water supply to the dental caries problem.

This Bill S. 190 proposes to attack on a comprehensive basis this whole problem of research in reference to dental disease. There are a number of fields in which studies on a broad scale are urgently needed:

1. Broad epidemiologic studies of dental caries in the general population.

2. Studies of the influence of diet and nutrition on dental caries.

3. Epidemiologic studies of periodontal diseases.

4. Studies in oral bacteriology.

5. Studies of the relation not only of nutrition, but also of general physical health to diseases of the oral cavity.

6. Investigation and evaluation of methods and materials used in the treatment of dental diseases.

Here are six fields which, it seems to me, will offer possibilities of successful results. I am sure that dentists who are here, who are much more expert in this field than I am, will elaborate upon that list.

Research is one of four bases, it seems to me, for attacking this problem. It is a first requirement. The other bases upon which progress can be made in improving dental health are measures of prevention, treatment and education.

I have indicated that we have no specific method of prevention of dental caries except the suggestion from current studies that an optimum amount of fluorine in the water supply will reduce by one-half the amount of dental caries which develops among school children. We have made tests also of applying fluorine, a fluorine solution, directly to the teeth of the growing child, with results which seem very promising.

SENATOR AIKEN: Is fluorine naturally present in most water?

DR. PARRAN: It is, Senator. It is practically absent from some waters, particularly the waters of the Great Lakes. It is excessively prevalent in some places, notably in Texas and the Southwest.

The first lead as to the influence of fluorine in connection with dental decay came from studies in areas where an excessive amount of fluorine in the drinking water was causing mottling of the teeth. The teeth, though badly affected by mottling, were markedly less affected by caries. Our investigators have worked out what seems to be the optimum amount of fluorine, an amount not large enough to cause mottling of the enamel, but at the same time sufficient to reduce the amount of caries.

SENATOR AIKEN: Was it true that in that West Tennessee area, which I believe was found remarkably free from dental decay, there was a high degree of fluorine in the water?

DR. PARRAN: May I ask Dr. Knutson, one of our dental officers, if he can respond to that question?

DR. JOHN W. KNUTSON (United States Public Health Service): There is fluorine in the western part of Tennessee and that may be one of the factors.

SENATOR AIKEN: There is a high degree of fluorine?

DR. KNUTSON: Not high, but there is more in the western section than in the eastern section.

SENATOR AIKEN: When I read the article some months ago, I wondered whether it was minerals or a high amount of catfish in the diet, perhaps, among those people that supplied more phosphorus.

DR. PARRAN: I referred to the four bases of a national dental health program: (1) research; (2) prevention; (3) actual dental care and treatment, and (4) education.

A section in the proposed legislation provides for demonstration studies which will afford the means by which we can determine definitely the preventive value of research findings. We believe that such pilot plant operations halfway between the laboratory and a mass, widespread national program ought to be very valuable.

In connection with dental care, I have already indicated the general line of approach; namely, that the services should be available especially to children and to other so-called vulnerable groups of the population. The adolescent child is particularly susceptible to development of dental disease because of the metabolic changes which are going on in the body. The same is true of the pregnant woman and the nursing mother. For these vulnerable groups, I feel that public health departments and educational departments, boards of education, school systems, should provide adequate care. It would have not only a definite value to the individual concerned, but a definite educational and community value as well.

Finally, we come to education, which naturally is basic to every public health activity. My dental friends point out a fact with which I think all of us would agree: that one can't oversell the public on dental care. No one is likely to seek more dental care than he needs. It is difficult for people, even those who realize the importance of dental care, to be persuaded to go to the dentist, even though the expertness of the profession is such that a session in a dentist's chair doesn't create the same sense of fear and pain as it did in earlier days.

I would emphasize the importance, then, of education of the public concerning the facts, not only the facts as we now understand them, but also, as research develops them, additional facts, which ought to be brought widely and broadly to the attention of the public.

SENATOR TUNNELL: You mean they don't fear the dentist as they used to.

DR. PARRAN: They don't fear the dentist as they used to, but I was trying to say that I don't think there is any danger of the person's going to the dentist just for the pleasure of it.

THE CHAIRMAN: It still is not one of the recreational centers.

DR. PARRAN: It is still not a recreational facility.

SENATOR TUNNELL: I was going to say, isn't there a more general appreciation now of the fact that bad teeth or difficulties with teeth that aren't even apparent affect the general health?

DR. PARRAN: That is exactly the case, sir. There are many focal infections, cases of arthritis, damage to the heart or kidney, which arise as a result of untreated infections in the mouth around the teeth.

Mr. Chairman, it seems to me that both of these bills are basically well conceived. The committee may wish to consider combining the provisions of them. If that does not seem desirable, however, I would suggest that consideration be given to having one dental advisory council which would serve the functions given to the two councils by the terms of the two bills. It would seem to me that one advisory council might serve to coordinate the work which was being carried out under the two bills. If the committee decides to report the bills separately, there should be no overlapping in administration, since, as you pointed out, Mr. Chairman, S. 190 deals solely with research problems, while S. 1099 is concerned primarily with grants-in-aid to develop better methods of treatment.

I may say that there may be a few amendments of a technical nature which later on I would wish to propose for consideration of the committee.

(Senator Aiken assumed the chair.)

SENATOR SMITH: Doctor, may I ask how the states vary as far as their giving attention to this problem is concerned, and do you plan to sort of move the whole thing into a federal program to work with the states?

DR. PARRAN: The states vary, in general, Senator Smith. There seems to be an increase in the amount of dental care as one moves from the South to the North and Northeast. As to the program that will be contemplated, under S. 1099 it would not be a federal program: it would be a nationwide program carried out primarily through grants-in-aid to the states, the grants-in-aid being varied so that a state which has the greater need would receive the larger per capita of funds.

SENATOR SMITH: Have you a formula worked out in these bills to determine the distribution?

DR. PARRAN: We have not worked out any formula in detail. The formula would be comparable with the formula which we are now

using in connection with tuberculosis control and venereal disease control, and comparable with the formula suggested in connection with the hospital bill. Copies have been put into the hearings on that bill.

SENATOR SMITH: Have you any rough estimate, even, of the cost of the kind of program that you would like to see put into effect?

DR. PARRAN: I really have not, Senator. That would be a very fair question.

SENATOR SMITH: That would be an annual appropriation, I suppose.

DR. PARRAN: It would be an annual appropriation, with estimates being made to the Appropriations Committee. I should like to see the problem approached conservatively so that we could feel our way and be sure that the methods that are being followed are sound rather than to develop a full-grown program overnight.

SENATOR SMITH: I notice in your opening remarks your estimate that S. 190 would need an annual appropriation not to exceed $730,000 a year.

DR. PARRAN: That figure is provided in the bill. That is the ceiling.

SENATOR SMITH: Then we could know pretty definitely what S. 190 would add to our federal budget.

DR. PARRAN: That is correct.

SENATOR SMITH: Do you contemplate, Doctor, in developing this and the hospital bill and the other medical programs that they have been discussing in these various hearings, ultimately to get an over-all estimate of the total medical cost? I am a little bit appalled by the size of these amounts and what we are going to be facing in the postwar period, and I would just like to get a picture of the amounts.

DR. PARRAN: I think those amounts could be reasonably ascertained; that is, one could estimate what one might term the optimum amounts which, in our opinion, the Federal Government might spend in the improvement of health and sanitation throughout the country. One can estimate the total over-all cost and then it seems to me a matter of legislative determination as to how that cost should be divided as between federal and state governments; what proportion of the cost of developing better public water supplies or hospitals should be borne by the federal government, for example, would be a matter of legislative determination. I think that we could supply to the committee a statement of the over-all national health needs.

SENATOR SMITH: I gathered from your previous statement that you think that, in some of these areas, we can move along slowly, experimenting as we go, and seeing what is the best way to evolve. My own judgment is that that is the right way to do it, not try to blueprint the whole thing from A to Z at the start, but move into the philosophy of the whole business and develop our program as we get more experience.

I feel the same way about the public health program, the hospital program, this program —they are all vitally important, but I can readily see that we might make mistakes if we tried to go in too far and got a lot of white elephants around the country that we couldn't take care of.

DR. PARRAN: The plan suggested by you is the one that we have followed in connection with several programs, the latest being the tuberculosis program, which, although the estimate for the first year was $10,000,000, was actually less than $1,000,000 for the first year, and for this ensuing year about $6,000,000. We are feeling our way more slowly in that program.

SENATOR TUNNELL: There is no limit to what could be spent, is there?

DR. PARRAN: I think there is a limit to what can be profitably spent in improving public health. The figure would be substantial, the upper limit.

SENATOR TUNNELL: I am not saying it isn't advisable. I am only saying that there is hardly any limit.

SENATOR AIKEN: Dr. Parran, isn't it probable that a reasonable amount spent in dental inspection and care among school children would result in lower costs both to the individual and to the public in later life? You have said that neglect of the teeth is responsible for aggravating other diseases of the body. I think that is generally well known. More people, of course, become public charges if they are unable to work later in life and, to that extent, there would be a reduction in public costs. On the other hand, if school children have proper attention to their teeth while they are in school, their own personal costs are very naturally reduced later on.

In looking at this problem, this matter and other allied subjects pertaining to the health of the people, it seems to me that while we

do want to know what it costs, the principal question that we should ask is, What will the returns on the investment be? Just as any one would ask if he were purchasing stock or buying a building to rent. So it seems to me that this reasonable investment made when these children are young will pay both public and private dividends later on in life.

DR. PARRAN: Senator Aiken, you have expressed much more clearly, fluently, than I could the whole basic philosophy that we hold in reference to public health.

SENATOR AIKEN: We found, in some of the work done in my community, that bad eyes increased truancy. When bad eyes were corrected, and the children could read their books, there was less tendency to skip school. And when, as I have already said, a child cries all night with a toothache, he certainly can't pay attention in school the next day. He is rebellious; he doesn't study; he doesn't make so good a citizen, probably. Maybe I shouldn't mention that, because I lost weeks howling with a toothache when I was in school.

I think we should consider the whole thing in the light of return on the investment.

MR. KRAMER: Dr. Parran, do you happen to have any estimate of the incidence of industrial absenteeism as the result of dental troubles?

DR. PARRAN: I am not familiar with any studies on that line. It may be that such studies have been made, and if I can find any information on that score, with your permission I should like to submit it.

SENATOR SMITH: Does the bill contemplate compulsory dental care in the schools, or is that left to the parent to determine?

DR. PARRAN: The latter. It does not contemplate any compulsory care.

SENATOR AIKEN: The methods would be worked out between your office and the state agencies concerned anyway, wouldn't they?

DR. PARRAN: They would, Mr. Chairman, and in that connection I may say that we have had a very gratifying experience in our cooperative relationships with the states.

SENATOR AIKEN: And I have yet to find in our community any parents that objected to having their children's teeth attended to. They did have difficulty, at times, in finding the money to do it with, but through different organizations or the parents themselves or in some way the money was usually found, although it came pretty hard. I realize that our community was probably better off financially than a good part of the United States, although we are not a rich community by any means.

SENATOR TUNNELL: Isn't it the tendency on the part of the parent in a good many sections just to pull the tooth, if the child is having trouble, and not treat it?

DR. PARRAN: That often happens.

SENATOR AIKEN: That is because it is cheaper, Senator. That is what they did with me.

SENATOR TUNNELL: Yes, that gets the results.

SENATOR AIKEN: Thank you, Dr. Parran.

Formal Statement of Surgeon General Thomas Parran

Mr. Chairman, it is a pleasure to appear before this committee at your request. I am not informed as to the relation of S. 190 and and S. 1099 to the program of the President. Therefore, I shall speak only of my general knowledge concerning the problems. S. 190 establishes in the Public Health Service a national institute of dental research, authorizes an appropriation of $1,000,000 for the construction of the institute, and authorizes an annual appropriation, not to exceed $730,000 per year to maintain the institute and to provide grants-in-aid of dental research. Grants-in-aid would be given only on recommendation of the National Advisory Dental Research Council. Such grants-in-aid may be made to any research institution, public or private, and a provision is made for fellowships. The broad purpose of the bill is to aid and foster and coordinate studies relating to the cause, diagnosis and treatment of dental diseases and conditions.

S. 1099 amends the Public Health Service Act so as to provide assistance to states in developing and maintaining dental health programs. Specific provision is made for (1) financial aid to states for the prevention, treatment and control of dental diseases, including dental care for children; (2) training of personnel for dental health work and education of the public concerning matters related to dental health; (3) federal grants to states, municipalities, educational institutions and other nonprofit agencies for studies and demonstrations programs in dental care, administrative practices and development of methods

of payment for dental services, and (4) funds to enable the U. S. Public Health Service to conduct similar studies.

The general administrative features of S. 1099 are similar to those set forth in the Public Health Service Act with reference to the Federal Grants and Services to States for tuberculosis, and for venereal disease control. The bill would create a national dental health council to advise the Surgeon General and to make recommendation relative to the Act.

These two bills are interrelated, and together provide a broad approach to a serious national health problem. With your permission I shall seek to define the incidence and extent of dental disease, the amount of dental care being received, the costs of dental care, the numbers and locations of members of the dental profession, the results of experimental and research technics, which have thus far been undertaken on a small scale, and I shall suggest some methods for attacking the several aspects of the problem.

Dental diseases are among the most common of human ailments. Almost all the population is afflicted with them, and they often induce a train of related maladies. Dental diseases are not peculiar to any one group of people, whether defined by age, race, sex, geographic location or economic status. The common pattern is dental decay, toothache, tooth loss, malocclusion, pyorrhea and eventual loss of teeth.

The two major causes of dental ill-health are caries and pyorrhea. Dental caries, or tooth decay, is the destroyer of most teeth that are lost by persons until they reach approximately their middle thirties. Thereafter, pyorrhea takes over as the enemy of dental health. Caries starts to work almost as soon as the child has teeth to be attacked. More than nine of every ten children, by the time they reach the age of 6, have one or more decayed teeth. That is just the beginning. At about this time, caries begins in the permanent teeth, so that by the time a boy or girl reaches 18, nine teeth, on the average, have become decayed and several extractions have been made. This continuing loss of teeth upsets the proper arrangement of the others, and predisposes to pyorrhea, a tissue disease which takes a heavy toll of the teeth remaining in adult life. In addition, neglected, untreated, diseased teeth and gums may be the direct or indirect cause of many other maladies, including toothache, acute dental abscesses and focal infections with resulting arthritis, neuritis, neuralgia, valvular heart disease and diseases of the kidneys and the gastro-intestinal tract.

The opportunities for carrying out dental studies in the past, and the funds expended thereon, have been distinctly limited. Accordingly, there are many fields of investigation in dental disease in which knowledge is far from complete.

In the well-known "Survey of the Dental Needs of Grade School Children in Hagerstown, Maryland," made by the Public Health Service in 1937, 4,416 children, 94 per cent of the enrollment, were examined. Among these children, there were found approximately 12,000 permanent teeth which had been attacked by caries. Of the primary teeth remaining to these children, approximately 10,000 showed decay. That was the accumulation of decayed teeth. It was found that caries develops in children at a remarkably constant rate from year to year. One additional tooth every sixteen months became carious; this making an accumulation of nine carious teeth at age 18. That rate is approximately the national rate among children.

In 1933 and 1934, the Public Health Service, with the cooperation of 8,000 practicing dentists, surveyed the dental needs of approximately 1,500,000 school children in twenty-six states. These children were in the 6-14 year age bracket, and included both white and colored, with equal representation of both sexes. The findings on this extensive survey were similar to those of the Hagerstown study: three-fourths of a tooth attacked per year, or one additional tooth attacked every sixteen months. As might be expected, there were some variations between different localities—caries increases slightly from South to North. Other studies show the same trend.

The seriousness of these developing dental defects in children appeared in the Selective Service examinations. Among the first 2,000,000 men called for Service, 20.9 per cent of the rejections were the result of dental deficiency. This percentage led all other causes of rejection in this group of men. The rate of rejection for dental defects was running so high during the first years of the operation of our draft system that the Army found it necessary to modify drastically its dental requirements. The earlier standards themselves

were not high: the applicant needed to have only three pairs of matching incisors and three pairs of matching chewing teeth. Among those first 2,000,000 men, most of them young men under 30, more than one of twelve failed to qualify under those terms. The modified requirements practically eliminated all standards of dental health, except for such conditions as malformations of the jaw, and passed on the job of treatment of hundreds of thousands of dental cripples to the Army Dental Corps. Under that revised program, more than 1,000,000 men have up to now been made fit for service by Army dentists, by prosthetic fittings and fillings. Figures supplied to the Public Health Service by the Army Dental Division show the amount of rehabilitation work performed during the period from Pearl Harbor through April 1945: fillings, 67,000,000; extractions, 15,600,000; teeth replaced, 17,400,000; dentures, 2,426,000; denture repairs, 685,000; fixed bridges, 231,000; treatments, for prophylaxis and pyorrhea, 8,800,000.

For every 100 men inducted into the Army, there have been 170 extractions and 740 fillings.

It is apparent that the dental health of the young men of this country, men who should be at the peak of their efficiency, is not good.

Detailed information regarding the prevalence of dental defects among the entire adult population of the United States is limited. From the available data, one of our dental officers, who has given the problem much thought, has arrived at the following approximate figures, which represent the accumulated dental needs of the entire population of the country: extractions needed, 238,500,000; fillings needed, 632,000,000; prophylaxes needed, 125,000,000; crowns and bridges needed, 39,500,000; partial dentures needed, 20,000,000; dental disease treatments needed, 20,000,000.

The extent of this prevalence among the general population may be pictured in another way: an overall average need per person of 1.9 extractions, 5 fillings, 1 prophylaxis and 1 examination, 0.3 crowns and bridges and 0.2 dentures.

Dental defects are not merely additive in their occurrence: the more neglect, the more severe each defect becomes. Thus, through neglect alone, dental treatment needs are greatly increased and the cost of care is multiplied.

The accumulated unfilled needs have tremendously increased the extent of the problem, as is shown by a comparison between present needs and service received. (Table 1.)

Table 1.—Present Need and Service Received

	Needed	Present Service (Yearly)
Extractions	1.9	0.03
Fillings	5.0	0.4
Examination and prophylaxis	1.0	0.03
Crowns and bridges	0.3	0.04
Full dentures	0.2	0.01

The magnitude of the task presented, if attempts were made to catch up with this vast accumulation of dental needs, would be very great. It is estimated that 800,000,000 hours of work would be required to do that job, not including the needed laboratory time (based on the following requirements: fillings, 40 minutes; extractions, 30 minutes; crowns and bridges, 100 minutes; prophylaxes, 60 minutes).

In view of this great backlog of accumulated needs, it is not surprising that the reaction to the problem by health officers and many other public and private officials has been one of resignation or outright indifference.

Although the amount of dental care received varies inversely with income, a low income is not the sole cause of our low level of dental care. There are not enough dentists to take care of all of our needs, even in normal times, and now one-third of these professional personnel are in the Service. Besides the basic insufficiency in their numbers, dentists are not geographically distributed according to the need for dental care. They are most numerous in areas with high per capita incomes. (Table 2.)

The shortage of dental personnel is a matter that has been and is of considerable concern. Best estimates are that, in the immediate postwar period, there will be in this country no more than 70,000 to 75,000 dentists.[1] Even if these were geographically distributed according to the requirements of the population and working at maximum productivity, the tremendous dental needs could scarcely be met. Unless means are found whereby they

1. Morrey, L. W.: Dental Personnel: J.A.D.A. 32:131, February 1, 1945.

can treat more than the average of 400 patients each year, as recently estimated, this group of dentists will be able to furnish service to only about one-quarter of the population.

The number of dentists proportionate to the whole population has decreased since the Census of 1930. In that year, there were in this country 71,055 dentists and there was a ratio of one dentist to every 1,729 persons. In 1940, there were 70,601 dentists and a ratio of one dentist to every 1,865 persons.

We can anticipate the availability of fewer dentists than the prewar number to practice their profession in civilian society of the immediate postwar period. The Army and Navy Training Programs for dental personnel contributed to the maintenance of new enrollments in the dental schools in 1943 and 1944. The Army has discontinued its dental training program, and it is expected that enrollments sponsored by the Navy will come to an end this year. Very few young men will otherwise enter on dental training under wartime conditions. It is estimated that only a very small fraction of the number of new enrollments of previous years will be recorded in the school year 1945-1946.

Since the areas and localities in which dentists settle in order to carry on the practice of their profession are to a great extent determined by the economic status of the resident population, the cost of dental service becomes a factor for consideration. As a matter of information, a study of dental costs shows the following[2]: prophylaxis, $1-5 (most frequent charge, $2); extractions, $1-5 ($2); x-ray, $5-15 ($10); two-surface amalgam fillings, $2-30 ($2-$5); two-surface gold inlay, $2-100 ($10-15); full denture, $25-100 ($50).

Where there is such a wide variance of income obtainable from dental services, it is not surprising that the members of the profession have tended to congregate in the urban centers and the wealthier sections of the country. According to the 1940 Census, almost half of the dentists were located in six states—New York, Pennsylvania, California, Illinois, New Jersey and Ohio. (Table 3.) It should be noted that not only did these states include only 33 per cent of the total population, but also within their borders there were large rural areas whose residents did not have access to a sufficient number of dentists. (Table 4.)

I believe that you will be interested in the experimental and research work that the United States Public Health Service has been able to carry on with limited funds. Over the past fifteen years, a small staff of research workers at the National Institute of Health has presented the following findings:

1. Delineation of the endemic areas of dental fluorosis (mottled enamel) in the United States.

2. Determination of maximum fluorine content desirable in public water supply.

3. Development of an analytic chemical method for estimating within one part in 10,000,000 the fluorine content of water.

4. Development of a method for removing excess fluorine from public water supplies.

5. Establishment of "a base line of incidence" of dental caries and dental needs in children.

6. Demonstration of the marked relationship between the fluorine content of public water supplies and dental caries. This has been the basis for the experimental technics now in progress having as their goal the partial control of dental caries through a communal medium, the public water supply.

7. Demonstration of the effectiveness of sodium fluoride when applied to the teeth of children for control of dental caries.

8. Establishment of the epidemiologic characteristics of certain bacteria in relation to the amount of dental caries in a community.

9. Introduction of a new experimental animal, the Syrian hamster. A new type of research in dental caries was thereby made possible.

10. Development of methods of evaluating dental health programs.

11. Determination of specific morbidity rates for Vincent's infection (trench mouth) among Coast Guard and Maritime Service personnel.

12. Demonstration of the unreliability of stained smears in diagnosing Vincent's infection and development of a method for growing pure cultures of oral treponemes, especially those associated with oral infection.

So you see, the greater part of the dental research done at the National Institute of Health has been concerned with studies of

2. Leven, Maurice: Practice of Dentistry and Income of Dentists in Twenty States. University of Chicago Press, 1929.

mottled enamel and dental caries. Some investigations have been made of the nature and cause of soft tissue diseases of the mouth, such as pyorrhea and Vincent's infection. Since the war, special studies of Vincent's infection have been made.

I believe that these bills which we are considering, if they are passed, will afford the resources, the organization and the plan of operation which will materially improve the dental health of the nation within the forseeable future. Some of the studies which should be undertaken include:

1. Broad epidemiologic studies of dental caries in the general population.
2. Studies of the influence of diet on dental caries.
3. Epidemiologic studies of periodontal diseases.
4. Studies in oral bacteriology.
5. Studies of the relation of nutrition and the general physical condition to diseases of the oral cavity.
6. Investigations and evaluation of methods and materials used in the treatment of dental diseases.

These are six of the broad fields of dental research offering the possibility of gratifying results. Within each field, there is need for other complementary studies. Much of this work is in new fields, which long have needed to be explored.

Effective, extensive, thorough-going research is one of the four pillars upon which a successful dental care program must rest. The other three pillars are prevention, treatment and education.

A section of this proposed legislation provides for demonstration studies that will afford the means by which the definite preventive value of research findings as applied to the general population may be determined. In the field of dental disease, research findings which will contribute actively to prevention are as yet very meager. There has been gained some idea of the value of fluorine as a preventive of caries, although the cause of that disease remains unknown. That an excess of fluorine content in the public water supply will cause mottling of enamel is known. But there are many dental diseases and defects for which there is no knowledge of any preventive. A few of these are: pyorrhea, in its various forms, Vincent's infection, malformation of the jaw, atrophy of the bony structure, oral tumors, oral cysts, calculi and malformation due to endocrine disturbances. The determination of preventives for these and other afflictions is a task that will be difficult and time-consuming, but by no means impossible of accomplishment.

Until the time arrives when knowledge of prevention has been very greatly expanded by wide research, and the results of research applied in demonstration studies, most of our front line attack on dental disease must be made through the third point of this program —treatment. Members of the dental profession, health officers and other competent persons have taken the position that the most effective approach to the problem of combating the dental deficiencies of this country is through the early treatment of caries. In the latter part of 1944, the House of Delegates of the American Dental Association approved the following principle: "Programs developed for dental care should be based on the prevention and control of dental diseases. All available resources should first be used to provide adequate dental treatment for children and to eliminate pain and infection for adults." The logical sequence in this desirable course is contained in this recent statement: "The dental profession should bend its every effort and the efforts of its auxiliary forces toward controlling caries by the most practical method known at the present time, namely, dental operative procedures for children."

This program might first deal with children aged 6 to 18 years. In 1940, this group constituted 26 per cent of the "dental population"—persons between the ages of 2 and 65. Let me remind you that the incidence of caries among the school age group is three-fourths of a tooth a year. Accordingly this group of approximately 30,000,000 children would develop 22,500,000 new carious permanent teeth annually. This group of children shares in the proportion of dental care to dental needs to an extent no greater than the national average of approximately 25 per cent.

(Continued in next issue.)

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September 1 **EDITORIALS** 1945

DENTAL EDUCATION AT COLUMBIA UNIVERSITY

A program with the announced purpose of "integrating" the faculties of the dental and medical schools has been undertaken by Columbia University. The program plainly goes beyond "integration" and places dental education at the university under the domination of medicine. It is obvious that the traditional autonomy of the dental school has been sacrificed by constituting the School of Dental and Oral Surgery as the Department of Dentistry of the Faculty of Medicine. This program has won the spirited opposition of a majority of the dental faculty at Columbia and of many dentists and dental educators, who believe that it threatens not only the autonomy, but also the form and substance, enjoyed by dental education for the past century.

Columbia University has well-merited prestige in the field of education, but this reputation alone should not allow a program having great potential influence on dental education to go without critical examination of the highest order. The circumstances under which the program was devised and enacted also dictate its analysis for the ultimate effects on dental education and practice.

The School of Dentistry, Columbia University, was established in 1916 and eight years later was merged with the College of Dental and Oral Surgery of New York, which had had an independent existence since 1864. This autonomy was maintained until 1933, when the dean of the medical faculty was named dean of the dental school. A dentist was given the rank of associate dean of the dental faculty and became the immediate administrative officer of the dental school. In these years, the School of Dental and Oral Surgery, Columbia University, under an autonomous program, achieved distinction for its cooperation with medicine in the teaching of the basic sciences, and for its clinical facilities, its research and its faculty.

The new program calling for the "integration" of the dental and medical faculties was presented by the Dean, Willard C. Rappleye, of the Faculty of Medicine. His proposal was rejected by the dental faculty by a vote of ten to nine. It is important to note that the ten voting against the proposal were dentists, while the minority was made up of four dentists and five members of the medical faculty. The following resolution, reiterating the traditional position of the dental faculty, was then passed by the same margin:

> Resolved: That the School of Dental and Oral Surgery be accorded continued integration in the basic sciences and research with the College of Physicians and Surgeons and further that administrative control of the School of Dental and Oral Surgery be vested in its faculty, headed by a whole-time dean possessing the degree of doctor of dental surgery.

In the face of this rejection by a majority of the members of the dental faculty, the President, Nicholas Murray Butler, felt called upon to announce that the university "should not permit a faculty which is substantially equally divided to stand in the way of carrying out this important undertaking." The dental faculty was not permitted to stand in the way and the minority program was made effective July 1, 1945.

The new program disbands the dental faculty as such. The basic administrative authority of the dental school is placed in the hands of the medical faculty. Four members of the new department of dentistry are given seats on the faculty of medicine, which has approximately sixty-five members. A committee on dental education, selected with a majority of dentists from the faculty of medicine, will recommend to the medical faculty the standards of admission, the nature of the curriculum, the candidates for the dental degree and "such other educational matters as properly may be assigned under the statutes (of the university) to such a committee." In effect, all formal planning for the future of dental education, all administrative authority and all responsibility for securing adequate support for dental education at Columbia rest ultimately with the medical faculty.

There can be no valid debate on the propriety of the university's undertaking to manage one of its schools according to its tastes or of undertaking experiments, no matter how poorly conceived, that may lead to the eventual improvement of dental education. There are areas, however, of social benefit and utility which become common ground for many groups. Dental education, in this light, is of interest and importance not only to Columbia, but also to dentistry at large.

The views of the majority of dentists in this country cannot be misunderstood on the question of autonomy. The profession has fought for, secured and maintained its autonomy in education and practice for too many decades to submit now to arbitrary domination and imperialism by any group. The House of Delegates of the American Dental Association,[1] as recently as 1944, stated bluntly that it "does not approve of the attitude of certain medical schools in attempting to designate dental schools as the dental department of schools for medicine." The Council on Dental Education[2] has announced its position unequivocally in the following terms:

> The Council will not be satisfied with the nominal or casual affiliation of a dental school with a university but will expect its administration, its teaching and its research to be conducted

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1. Tr. A.D.A., 1944, p. 369.
2. Requirements for Approval of a Dental School. The Council on Dental Education. American Dental Association, 1941, p. 5.

in harmony with the purposes and methods of higher education. This view contemplates the recognition and acceptance of a dental school by the university of which it is a part on equal terms with the university's other professional schools, and anticipates that the dental school shall live up to the traditions and shall sustain the standards of scholarship, the exactness and thoroughness of scientific endeavor and the true university spirit of its parent institution.

The Council has further reinforced its stand on this important issue by declaring:

If a school for the study of dentistry which has been approved by the Council on Dental Education undergoes fundamental changes in its administrative organization, university relationships, curriculum plans, faculty organization, instructional program or stated objectives, approval shall be suspended until such time as the Council may again appraise the institution in terms of its policies and criteria.

This question of the autonomy of dental education is not, as some would have it, largely "psychologic, emotional and traditional." It is part and parcel of dental progress in this country. It is one with the policy that offers intimate cooperation with all groups in the improvement of public health and rejects all efforts at dictation or domination. Independence in dental education and dental practice has been purchased at too high a cost to be relinquished now for experiments that have already cast the long shadows of failure before them. Columbia University would do well to reexamine at once the signs that point down the path of improved dental education.

THE CASE AGAINST "TAXI"

For more than twenty-five years, something called "Taxi" has been purchased by credulous dentists to aid in the cleaning of teeth. It is no tribute to rational dental therapeutics or to agencies designed to protect the public against dangerous nostrums that "Taxi" was permitted to continue on the market for such a long period.

Eighteen years ago, the Research Council of the New York Academy of Dentistry reported that "Taxi" was approximately a 4 per cent aqueous solution of hydrochloric acid.[1] Nine years later, the Council on Dental Therapeutics of the American Dental Association made the same findings[2] and declared the product to be inadmissible to "Accepted Dental Remedies." Recent tests by the Bureau of Chemistry of the American Dental Association indicate that "Taxi" is still essentially a 4 per cent aqueous solution of hydrochloric acid. Such uniformity of composition might be thought to be desirable, and indeed the manufacturer boasts that there has been "no change in formulae for the past 25 years" (label). But this steadfastness becomes highly undesirable, and even dangerous, when it is known that immersion of a tooth in "Taxi" for periods as short as five seconds has dissolved the enamel. Fifteen seconds' treatment of human enamel with "Taxi" produced marked decomposition.[3]

It is almost beyond belief that dentists who assiduously warn their patients against pernicious abrasives in dentifrices will themselves use a solution that is capable of dissolving human enamel. The use of "Taxi" on human teeth under any conditions is irrational, dangerous and stupid.

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1. J.D.Res. 7:477, December 1927.
2. J.A.D.A. 23:1975, October 1936.
3. J.A.D.A. 23:1976, October 1936.

This part of the tale is sordid enough, but there is another chapter.

"Taxi" tells two stories: one on its label, which comes within the purview of the U. S. Food and Drug Administration, and one in its advertising in certain dental journals, which is not within the province of the federal agency.

On its label, "Taxi" claims to be "expressly prepared for use by the dental profession as a detergent in removing stains and calcium deposits, from dentures, false teeth and bridges, glasses, cuspidors, saliva ejectors without the use of abrasives." Conspicuously, there is no mention here of its common usage in cleaning teeth.

In its advertising,[4] however, "Taxi" insists that it is ". . . the all time favorite of dentists since 1917. Removes stains from the teeth instantly. No rubbing or brushing, simply apply." Here, the vendor is careful not to emphasize that the preparation is to be used only on inanimate objects such as dentures and bridges and outside the mouth.

The reason for this double-talk is obvious. Label claims for usefulness on human teeth might lead to seizure of the product by the Food and Drug Administration for misbranding and to subsequent litigation in the federal courts. There is no agency, however, either public or private, which has the authority to regulate "directions for use" when these appear in advertising in journals that are willing to match profits against public and professional welfare. The responsibilities of dental journalism in this connection are obvious and they have been too long, too frequently and too flagrantly neglected.

These evasions of the spirit of the Food and Drug law should be met by new legislation. Until they are, certain dental journals can contribute immensely to the cause by refusing to enter into the campaign of exploitation that inevitably must be associated with a therapeutically worthless and dangerous product.

ON THE WRITING AND REVIEWING OF BOOKS

The tendency to place credence in any piece of writing simply because it has won its way into print is unfortunately both human and common. This tendency is paralleled in those listeners to the radio who accept as gospel any statement that has been veneered with the assurance and unction of a commentator. It is strange that more persons do not disabuse themselves of this tendency by reference to almost any newspaper or magazine where truth and fact are evidently molded to the needs of a writer. This ignorance, these errors, distortions and untruths, however, seem to disturb them not a whit, for they continue to use as implacable and final argument the statement that something or other must be true because it was seen in print or heard over the radio.

As a matter of simple record, there are many, many things in print which represent an unconscionable sacrifice of labor, paper and ink. Such a sacrifice would be merely deplorable did it not have the triple result of (a) misleading or misinforming readers, (b) obscuring more worthy efforts and (c) perpetuating error.

The reviewer of books has a very definite function in this regard. He must not be impressed by the labors of publication. He must look beyond the orderliness of type and the quality of illustrations to examine the thesis of the writer and the competency with which it is stated. He must evaluate conclusions in terms of

4. D. Survey, 21:324, February 1945.

existing knowledge. Finally, he must indicate to the potential reader enough of the book's scope and validity to prevent the unnecessary pursuit of wild geese.

Dental texts and books of dental interest are not exempt from these strictures. They too need to be examined critically as tools for dentists and workers in dentistry. On their quality depends in large degree the character of knowledge upon which the profession must base its planning and work.

With this issue of THE JOURNAL, a section devoted to the critical review of books of interest to the dentist is initiated. It will be complete in its coverage, objective in its evaluations and, it is hoped, helpful and useful to potential readers.

EDUCATIONAL OPPORTUNITIES FOR RETURNING DENTAL OFFICERS

More than a fourth of the dentists replying to a recent questionnaire[1] have asked that additional training be provided for them on their return from service in the form of graduate, postgraduate and refresher courses. The Council on Dental Education[2] of the American Dental Association has now completed a compilation of such courses that will be offered by the dental schools of the country.

The results of this survey are gratifying although the dental schools have been under some difficulty in developing these educational opportunities for the veteran dental officer. Some schools encountered sharp restrictions in their physical accommodations and in their budgets so that little expansion beyond the undergraduate level was possible. Other schools are handicapped by the absence of teachers in the service. All schools, finally, faced the problem of not knowing exactly what the demands will be for instruction of this type and of not knowing in what particular fields of interest the major emphasis will be placed by the returning dental officers. Present facilities and opportunities will undoubtedly be multiplied as the specific needs and desires of a sufficient number of dental officers become known.

The Council on Dental Education, anxious to be of service to the returning veterans in any possible way, is prepared to furnish a copy of available courses upon request.

THE SECOND VICTORY

After more than three and a half years of war, this country is again at peace. The second great victory over aggression has been won with the surrender of Japan. The end of fighting in the field will seem to be the final victory to many, but such assessment cannot be made because the final victory can be established only by a just and enduring peace. The enormous labors of rehabilitation and reconstruction lie before us. It is now our task to build soundly on the foundations that have been renewed so arduously in battle. On the success of this effort rest the ultimate meaning and value of the second victory.

1. See p. 1127 of this issue.
2. See p. 1155 of this issue.

REPORTS OF COUNCILS AND COMMITTEES

COUNCIL ON DENTAL EDUCATION

GRADUATE, POSTGRADUATE AND REFRESHER COURSES IN THE DENTAL SCHOOLS OF THE UNITED STATES

The Council on Dental Education of the American Dental Association has compiled this material especially for the information of dentists in the armed forces who may be interested upon their return to civilian life to pursue graduate, postgraduate and refresher courses in the dental schools. These three types of courses are defined by the Council as follows:

1. *Graduate* courses may be defined as advanced courses planned for those especially prepared and qualified to do advanced study beyond the undergraduate level. The work done in such courses is of a character acceptable to the graduate school of the university and leads to a degree upon the completion of the requirements as specified by the graduate school. These requirements include individual research and the preparation of a thesis. The object of such courses is to fit individuals for a specialty, for teaching or for research.

2. *Postgraduate* courses in dentistry may be defined as special courses pursued intensively and exhaustively by students who are graduates in dentistry. The outlines of such courses should incorporate planned instruction in background work, such as science, laboratory and didactic classes, with the clinical work in a special field. Postgraduate courses do not lead to a degree, but may be rewarded by a certificate of proficiency and may lead to a specialty.

3. *Refresher* courses may be defined as short courses in clinical practice designed for the purpose of reviewing those clinical procedures learned and of refreshing performance skill developed by the student in the undergraduate curriculum. Such courses, while emphasizing instruction in new technics and improved clinical procedures, should include also a review of the literature and should require some organized formal study. They should especially refresh the students in the use of basic procedures in the art of practice, but should be extended to include advanced instruction in new knowledge relating to the basic sciences and their applications. They may be offered in residence or as extension projects. They do not earn credit toward a degree or lead to certification, and they are not designed to equip the student for a specialty.

In May 1945, the Council sought information from all the schools touching courses available in these three fields and reports this information substantially as it was received by states in which the schools are located, arranged in alphabetical order. Additional information may be secured by addressing the dean in each case.—*Harlan H. Horner, Secretary.*

California

School of Dentistry, College of Physicians and Surgeons, San Francisco 3, Ernest G. Sloman, Dean.

Refresher course in children's dentistry: This course is given two and sometimes three

times a year. The next beginning dates are October 1, 1945 and April 1, 1946. A refresher course of one week's duration affording fifty-three hours of lectures, demonstrations and clinical work performed by the staff of teachers and the registrants. The course is designed to teach dentists proven technics in this important field of practice. Classes are limited to nine registrants. The tuition fee is $50.

College of Dentistry, University of California, San Francisco 22, Willard C. Fleming, Dean.

Graduate courses: Under the administration of the graduate school; designed as preparation for dental research and teaching; leads to M.S. degree; minimum of twenty units of graduate work with major work in basic science and research. Few or no clinical courses. The M.S. is granted by the university and is not an M.S. in dentistry. Most of the credit is obtained in the college of dentistry, although graduate courses may be obtained in the basic science department of the university.

Postgraduate courses: Under the direction of the college of dentistry; designed as preparation for a specialty (academic legislation now in process to lead to a certificate). Major emphasis on clinical phases offered in major clinical divisions. May be one, two or three academic terms.

Refresher courses: Designed to bring a dentist up to date in a single field; short intensive courses from one to eight weeks; offered in major divisions.

Courses in 1945 and 1946: Postgraduate courses in orthodontics: Class begins November 1; applications must be filed prior to September 1, 1945; limited to four students. Full time, no private practice; three academic terms. Must take examinations for entrance.

Refresher course in orofacial prosthesis: Begins September 1, 1945; limited to four students, half time, eight weeks. This refresher course is prerequisite to registration for postgraduate work in this field.

Dental roentgenology: Begins September 1, 1945; limited to twelve students. Twenty hours of instruction given over a two-weeks period, afternoons, evenings or week-ends. Separate course for dental hygienists.

Dental medicine: Begins March 1, 1945. Courses offered in three parts. Part 1. Fundamental principles of dental medicine with emphasis on clinical diagnosis. Part 2. Advanced phases of dental medicine including the relationship between systemic diseases and oral conditions. Part 3. The application of preventive principles in the practice of dental medicine. Each part, twenty to thirty hours of instruction over two or three weeks period.

Courses in 1946 and 1947: The refresher, postgraduate program in 1946 and 1947 will offer the foregoing courses beginning July 1946. In addition, the program includes similar courses in surgery, denture prosthesis, crown and bridge, oral pathology, anatomy, children's dentistry, paradentics and nutrition. The 1946-1947 program is dependent on two items: the return of staff men from the armed services and a return to the normal program of two semesters per academic year.

General costs: Postgraduate and graduate courses per term: tuition $150, incidental fee $18, breakage and locker fee $5, laboratory and clinic fee $10. There is a nonresident fee of $75 per term. There are small special fees for late registration, and so forth. Other expenses include materials and supplies. Health and hospitalization service is provided for the regularly registered full-time postgraduate and graduate student.

Refresher courses: Fees for refresher courses are dependent on the length of instruction, materials, and so forth, and are set up for each course. For example, the refresher course in dental roentgenology is $24.

College of Dentistry, University of Southern California, Los Angeles 15, Julio Endelman, Dean.

A program of graduate, postgraduate and refresher courses is still in the formative stage.

District of Columbia

School of Dentistry, Georgetown University, Washington 7, John P. Burke, Dean.

It is hoped that by June 1946, the school either of its own accord or in conjunction with the District of Columbia Dental Society, will inaugurate a program of graduate, postgraduate and refresher courses.

College of Dentistry, Howard University, Washington 1, Russell A. Dixon, Dean.

A schedule of refresher courses has been established. These courses, each one week in length, are for the benefit of the general prac-

titioner of dentistry who wishes to keep abreast of the modern advances in his profession. The fee is $20 for each one-week session for new registrants or $15 for individuals who have previously matriculated in other divisions of Howard University.

Georgia

School of Dentistry, Atlanta-Southern Dental College, Emory University, Atlanta 3, Ralph R. Byrnes, Dean.

Refresher courses of a general nature for graduates in dentistry are offered. A student may enter a regular session at any time and build a schedule of his own choice and may remain for two weeks, a month or an entire session. The tuition is prorated on the basis of the annual fee.

Illinois

Chicago College of Dental Surgery, School of Dentistry, Loyola University, Chicago 12, R. W. McNulty, Dean.

The School will be prepared, beginning October 14, 1945, to offer refresher courses of two weeks each in the subjects of denture construction, crown and bridge work and operative dentistry. Denture construction will be taught October 14 to October 25; crown and bridge work from October 28 to November 8; operative dentistry November 11 to November 22. The class in each of these courses will be limited to ten students. The work of each course will be devoted to the single subject and will consist of both classroom and clinical instruction. Tuition and fees for each of these courses will be $100. Instruments and supplies are to be furnished by the student.

A postgraduate course in exodontia and minor oral surgery will be offered from October 1 to December 21, 1945. The course will include allied subjects required in this field such as anesthesia, radiographic interpretation and diagnosis. The class will be limited to three students. Tuition and fees for the course will be $300. Instruments and supplies for this course will be furnished by the school. Graduate study at the dental school is in the process of revision at the present time. Courses of graduate study will be announced at a later date.

Northwestern University Dental School, Chicago 11, Charles W. Freeman, Dean.

Graduate courses: The graduate courses leading to the degree of master of science in dentistry are offered in the following major fields: periodontia, pedodontia, preventive dentistry, prosthetic dentistry, oral surgery and orthodontics. Fee $510, which includes tuition fee and use of instruments and equipment. Applicants for admission must submit transcripts of college and dental school records. These courses begin in September and continue for one year.

Postgraduate courses: Special four-week postgraduate courses in denture prosthesis, crown and bridge construction and preventive dentistry may be taken separately or combined in one twelve-week course. These intensive courses include much clinical and laboratory work of a practical nature.

Denture prosthesis: Lecture, laboratory and clinic instruction in dental materials, complete denture construction, partial denture construction and periodontia. October 1 to October 27, 1945. Fee $150.

Preventive dentistry: Lecture, laboratory and clinic instruction in dental materials, operative dentistry, pedodontia, periodontia, radiology, nutrition and the chemistry of caries. October 29 to November 24, 1945. Fee $150.

Crown and bridge: Lecture, laboratory and clinic instruction. Dental materials, crown and bridge, periodontia, radiology and chemistry of caries. November 26 to December 22, 1945. Fee $150.

All three courses combined in twelve weeks, fee $400. This fee includes tuition, use of equipment, instruments and materials. These courses are planned for returning veteran dental officers. They will be repeated in the spring of 1946 according to the demand.

College of Dentistry, University of Illinois, Chicago 12, Allen G. Brodie, Acting Dean.

Efforts along the lines of refresher courses will be directed toward those men who left their dental schools and entered directly into the armed forces. Briefly, the course will consist of a general review of the main fields in the basic sciences with emphasis on recent advances and developments. This would constitute the theoretical part of the course and would consume two hours each day, which would be devoted to lectures and seminar discussions. The remainder of the time would be spent in the various clinics on a rotation

basis. It is estimated that the minimum time required for such a course would be three months and a student would study intensively in three fields of clinical dentistry for the first six weeks and then switch to another group of clinics for the following six weeks.

Graduate courses leading to the degree of master of science are already offered to graduate dentists who meet the admission requirements of the university graduate school. Under this type of training, work is offered in orthodontia, applied materia medica and therapeutics and histology. Postgraduate courses of not less than one quarter's duration are offered to graduate dentists in all departments of the college of dentistry to limited groups of men. Because of reorganization, offerings in the field of oral surgery have been discontinued for the present.

Indiana

School of Dentistry, Indiana University, Indianapolis 2, Maynard K. Hine, Dean.

Indiana University contemplates presenting a series of short refresher courses in the following subjects: prosthodontia, oral surgery and anesthesia, periodontia, children's dentistry, including public health dentistry, oral diagnosis, operative dentistry and crown and bridge work.

It is tentatively planned that these subjects will be presented one morning a week in the following order: oral diagnosis (4 sessions), operative dentistry (4 sessions), periodontia (6 sessions), radiography (2 sessions), prosthodontia (8 sessions), children's dentistry (4 sessions), public health (4 sessions), oral surgery (8 sessions) and crown and bridge work (8 sessions).

Each session will include a lecture and a clinic. When feasible, clinical work will be done by the student and continued through the afternoon. This schedule will allow the dentist to attend any combination of courses that he chooses. For example, by attending every morning for two months, he can get a refresher course in all subjects offered. If a dentist is interested in only dentures and surgery, he can attend the mornings that these courses are scheduled, etc. This plan will allow him to continue to practice while taking the refresher courses. It also places a lighter burden on the faculty.

Tentative plans call for the first classes to be held in January and February 1946 and repeated every other two months or as the demand warrants it. Details of the schedule, scope of courses and fees will be worked out in detail a little later and may be obtained from the dean of Indiana University School of Dentistry.

Iowa

College of Dentistry, State University of Iowa, Iowa City, Alvin W. Bryan, Dean.

Refresher courses in dentistry for the benefit of returning veterans will be set up as follows:

The basic refresher course shall be of six weeks duration and shall be offered once in each half year, probably beginning October 1 and January 15. Subjects: Denture, crown and bridge work, pedodontia, periodontia and roentgenology. Refresher courses in orthodontics for practitioners who have specialized in that field or who have previously received graduate training may be arranged by writing to the dean of the college.

Content: Registrants will be assigned to the infirmary for clinical work in the subjects chosen and patients will be made available to them. In addition to clinical practice, lectures and demonstrations will be arranged as found necessary by the departments concerned.

Students may register for a "general clinical course," in which case they are privileged to attend regularly scheduled lectures of the undergraduate curriculum, as they choose, and select clinical cases under any department.

Limit on size of classes: The size of refresher classes will be limited and the number to be enrolled will be governed by the judgment of the faculty.

Tuition: Tuition for refresher courses, subject to the approval of the Board of Education, is $50.

Graduate courses in orthodontics and pedodontics are offered. Only those who are eligible for admission to the graduate college may enroll for these courses. The course begins at the opening of the senior academic year and requires from one to one and one-half years, depending on the amount of time devoted to study. Upon completion of one year of this course, a certificate in orthodontia is granted and the master of science degree is awarded when the course is fully accomplished. Tuition is $130 for the academic year.

Kentucky

School of Dentistry, University of Louisville, Louisville 2, Raymond E. Myers, Dean.

No definite plans have been made.

Louisiana

School of Dentistry, Loyola University, New Orleans 15, Thomas D. Speidel, Dean.

Loyola University School of Dentistry, New Orleans, is planning a program of refresher courses to begin during the 1946-1947 school year. The only course available before that date will be in dentistry for children, September 1945, in conjunction with the city and state departments of health. Details of the courses will be announced at a later date.

Maryland

Baltimore College of Dental Surgery, University of Maryland, Baltimore 1, J. Ben Robinson, Dean.

The Baltimore College of Dental Surgery has been unable to plan finally for the possible demand on it for postwar courses; but it is standing by, prepared to meet any reasonable need, with its existing facilities quite adequate for any appreciable demand. It is in need of competent teachers, who would be required to staff an enlarged program. With an augmented teaching staff, the Baltimore College of Dental Surgery can accommodate at any one time approximately fifty students enrolled in refresher courses and a score or more of postgraduate students.

Massachusetts

Harvard School of Dental Medicine, Boston 15, A. LeRoy Johnson, Administrative Officer.

The Harvard School of Dental Medicine is preparing a retraining course of one academic year for returning veterans who are qualified dentists, who wish further experience before resuming civilian practice. This course will cover all phases of clinical dentistry. It will not give special emphasis to any of the so-called specialties. A certificate will be given at the end of the period for work satisfactorily completed. The course will begin October 1, 1945. Tuition $500.

Tufts College Dental School, Boston 15, Basil G. Bibby, Dean.

To meet the need for courses which will cause but little interruption in the practice of dentists who return from the Army and Navy, and those who have remained in civilian practice, the following short refresher courses are offered during the next academic year. As will be noted, these courses are conducted on a one-day-per week basis for periods ranging from four to eight weeks. Some of the courses are condensed to a five-day period and others are offered on an extension basis.

Courses offered on one-day-per-week basis: September 12: Periodontia (8 weeks); October 15: Prevention and control of oral disease (6 weeks); November 7: Operative dentistry (inlay) (4 weeks); October 22: Oral surgery (8 weeks); November 14: Clinical pathology and diagnosis (6 weeks); November 2: Practice management (4 weeks); January 7: Dentistry for children (6 weeks); February 21: Surgery (4 weeks); February 14: Operative dentistry (inlay) (4 weeks); March 4: Operative dentistry (plastics) (4 weeks); April 4: Clinical pathology and diagnosis (6 weeks); April 18: Surgery (4 weeks); May 7: Full denture prosthesis (4 weeks).

Courses offered in consecutive periods: Full denture prosthesis (1 week); anatomy of head and neck (1 week); prevention and control of oral disease (1 week); dentistry for children (1 week).

Extension courses: All of the above-mentioned courses are also offered on an extension basis to groups of dentists who reside at distant points and, as a consequence, find it difficult, if not impossible, to participate in residence courses.

Postgraduate courses have been organized on a group basis as follows: Group I: General medicine, dental medicine, periodontia, diagnosis, public health. Group II: Prosthetic dentistry, operative dentistry, dentistry for children. Group III: Anesthesia, surgery.

Veterans and other dentists may register for any group or for the entire course in general dentistry, which will extend throughout two semesters. It will also be possible for the practitioner to elect modifications of any basic group and concentrate in his field of interest. The work of the various groups may be spread more than one year and may be completed on the basis of two full days per week by this method.

Graduate courses are now in process of organization and will be announced in the near future.

Michigan

School of Dentistry, University of Detroit, Detroit 26, Leo I. Caderette, Dean.

Refresher courses are being planned. Announcement will be made later.

W. K. Kellogg Foundation Institute, School of Dentistry, University of Michigan, Ann Arbor, Russell W. Bunting, Dean, P. H. Jesserich, Director of Institute.

Graduate courses: For those who wish to acquire a foundation for teaching or research and for those who desire to qualify as specialists in some branch of dentistry, the graduate school of the university offers courses leading to the degree of master of science in dentistry. It is not intended that work leading to this degree shall be denied to those who engage in clinical practice, but it is offered more especially to assist men to obtain a broader training in special phases of dentistry in preparation for teaching or research careers, diagnostic work in hospitals or in groups of medical practitioners or in the preparation for specialists where a specific training is required.

Only those applicants who have shown unusual ability and who, in their undergraduate courses, have earned an average grade of B will be admitted to the graduate courses. A curriculum of study for the master of science degree will be arranged by a committee to meet the needs of the individual candidate and to prepare him for the particular objective in view. The requirements for the master's degree are a minimum of twenty-four semester hours of credit, of which six to eight hours may be allowed for clinical work. Since, in many states, thirty semester hours of credit are required for accreditation to practice of the specialties, those who intend to practice in such states are urged to complete thirty hours. The degree of master of science in public health regularly requires thirty hours of credit.

A candidate for the master's degree should submit to the postgraduate committee detailed transcripts of preprofessional and professional work and other information which will aid in determining his eligibility and in formulating a suitable program of studies. If the candidate's credentials are acceptable, he will be referred to the dean of the graduate school for approval of his admission and study program.

Graduate work leading to the master of science degree is offered in the following fields: complete denture prosthesis, crown and bridge prosthesis, dental therapeutics, dentistry for children, materials, oral pathology and diagnosis, oral surgery, operative dentistry, orthodontics, partial denture prosthesis, preventive dentistry and periodontia, public health dentistry, root surgery, radiographic diagnosis and management of periapical infections.

Graduate fees: Full time: Michigan residents, $65; nonresidents, $110. Three or four hours: Michigan residents, $35; nonresidents, $55. Five or six hours: Michigan residents, $50; nonresidents, $75. Seven or eight hours: Michigan residents, $60; nonresidents, $90.

Postgraduate courses, 1945-1946: A series of short, intensive postgraduate courses has been arranged for returning veterans. These courses can be elected as single units or in sequential groups of from two to fourteen weeks. Each unit course program consists of lectures, seminars, demonstrations and clinical practice in its respective field of dentistry. These units vary in length from one to four weeks as signified by the dates in the sequential outline of courses. Each one of these unit courses is limited to not more than twelve students. All applications must be received at least six weeks in advance of the beginning date of the course, but, to be assured of acceptance, it is advisable to make application as far in advance as possible.

Fees: One-week units: Michigan residents, $30; non-residents, $40. Two-week units: Michigan residents, $60; nonresidents, $75. Four-week units: Michigan residents, $120; nonresidents, $150.

Fees for a sequential grouping of units will be the total of the unit fees.

November 12-24, root canal surgery; November 12-24, minor oral surgery; November 12-24, complete denture prosthesis; November 26-December 21, orthodontics (for returned veterans who are specialists in the field of orthodontics); December 10-21, dentistry for children; January 7-18, operative dentistry;

January 21-February 1, oral pathology; January 21-February 1, dental caries control; February 4-9, operative and interpretative radiodontics; February 11-22, root canal surgery; February 11-22, periodontics; March 4-15, complete denture prosthesis; March 4-15; preventive orthodontics for general practitioners of dentistry; March 11-22, crown and bridge prosthesis; March 25-30, ceramics; March 25-April 6, minor oral surgery; April 1-6, complete denture prosthesis; April 15-27, operative dentistry; April 29-May 10, orthodontics for public health dentists; May 6-18, crown and bridge prosthesis; May 20-June 1, root canal surgery; May 20-June 1, minor oral surgery; May 20-June 1, dentistry for children; June 3-8, operative and interpretative radiodontics; June 10-21, complete denture prosthesis; June 10-21, partial denture prosthesis.

Another series of postgraduate courses has been scheduled on a one-day-a-week basis extending over a period of a semester. These courses may be elected singly or in groups of two or more. Thus, it is possible to elect a program in four or five fields of dentistry on a part-time or full-time basis for a semester. The schedule of courses from which a program may be elected is as follows. Each registrant for these programs must be in attendance from the first day of the schedule selected.

Fees: One-day-a-week unit: Michigan residents, $60; nonresidents, $75. Fees for two or more days a week will be proportionate.

Complete denture prosthesis: November 27, December 4, 11, 18, January 8, 15, 22, 29, February 5, 12, 19, 26; November 30, December 7, 14, 21, January 4, 11, 18, 25, February 1, 8, 15, 22; March 19, 26, April 2, 9, 16, 23, 30, May 7, 14, 21, 28, June 4; March 22, 29, April 5, 12, 19, 26, May 3, 10, 17, 24, 31, June 7.

Crown and bridge prosthesis: November 29, December 6, 13, 20, January 10, 17, 24, 31, February 7, 14, 21; March 7, 28, April 4, 11, 18, 25, May 2, 9, 16, 23, June 6.

Dentistry for children: November 28, December 5, 12, 19, January 2, 9, 16, 23, 30, February 6, 13, 20.

Minor oral surgery: November 17, December 4, 11, 18, January 8, 15, 22, 29, February 5, 12, 19; November 29, December 6, 13, 20, January 10, 17, 24, 31, February 7, 14, 21; March 5, 12, 19, April 9, 16, 23, 30, May 7, 14, 21; March 7, 14, 21, April 11, 18, 25, May 2, 9, 16, June 6.

Operative dentistry: November 21, 28, December 5, 12, 19, January 2, 23, 30, February 6, 13, 20; March 6, 13, 20, 27, April 3, 10, May 1, 8, 15, 22, 29.

Partial denture prosthesis: November 21, 28, December 5, 12, 19, January 2, 9, 16, 23, 30, February 6, 13, 20; March 6, 13, 20, 27, April 3, 17, 24, May 1, 8, 15, 22, 29.

Periodontia: March 6, 13, 20, 27, April 3, 10, 17, 24, May 1, 8, 15, 22.

Root surgery: November 28, December 5, 12, 19, January 2, 9, 16, 23, 30, February 6, 13; March 6, 13, 20, 27, April 3, 10, 17, 24, May 1, 8, 15, June 5.

Minnesota

School of Dentistry, University of Minnesota, Minneapolis 14, William H. Crawford, Dean.

Graduate work in dentistry: Graduate work for a limited number of properly prepared students is offered in certain fields of dental research and dental specialties. The work is under the direction of a joint committee in dentistry and medicine in the graduate school. Candidates for admission must be graduates of an acceptable dental school with at least two years of preliminary general college work. They must also present or acquire sufficient training in the basic sciences, such as bacteriology, anatomy, pathology, physiology and physiologic chemistry, to enable them to apply these disciplines to research on some of the problems facing dentistry as one of the health sciences. The minimum training to meet this requirement at the University of Minnesota is in general the equivalent of that required of graduate students in the fields of clinical medicine. The basic science courses necessary as a foundation for advanced study are outlined under the departmental offerings in the graduate school bulletin. Although a reading knowledge of German is recommended as highly desirable, candidates for the master's degree in dentistry are exempt from the foreign language requirement. Qualified students who give full time to their studies and meet the requirements, including a satisfactory thesis, will normally require three years for the degree of master of science in dentistry.

The fields of research and specialization in which work will be directed are: oral path-

ology, oral surgery, orthodontia, periodontia and restorative dentistry.

Practitioners' course: In order to enlarge its educational field and to fill a need that has found expression among practitioners, the school of dentistry offers, from time to time, a series of courses in crown and bridge work, denture prosthesis, operative dentistry, oral diagnosis, oral hygiene, oral surgery, orthodontia, periodontia and similar subjects. Announcements regarding these refresher courses are published in the dental journals and, in some cases, notices are mailed directly to practitioners.

The school of dentistry also offers an opportunity for dentists to register for clinical courses in restorative dentistry during the school year. These courses extend over a period of from one or two weeks to an entire term and include crown and bridge work, denture prosthesis, operative dentistry, oral diagnosis and periodontia.

Missouri

Kansas City-Western Dental College, School of Dentistry, University of Kansas City, Kansas City 6, Roy J. Rinehart, Dean.

Three types of advanced work beyond the degree of dental surgery are now available to students having the proper qualifications. They are: (1) refresher courses for veterans and others who desire a brief review of dental subjects, (2) postgraduate courses for those interested in specializing, but who do not desire to qualify for an advanced degree and (3) graduate courses in which the degree of master of science in dentistry is awarded after completion of all requirements pertaining to that degree.

The master of science (M.S.) in dentistry: Total credit hours: Beyond the D.D.S. degree, thirty. May include a maximum of ten hours in liberal arts college listed to 300 to 599 courses; a maximum of eight hours in research and thesis and a minimum of twelve hours listed as 700 courses in the school of dentistry, all subject to the adviser's approval. Total grade points: Minimum of "B" in each course, sixty. Qualifying examination: To be passed before the end of the fourth week of the semester preceding that in which the degree may be awarded. Final examination: Administered by the adviser and a minimum of three other faculty members appointed by the dean.

Fellowships and assistantships: A fellowship for $750 is available for graduate work in plastic surgery, and two teaching assistantships are available for $1,500 for twelve months (one month's vacation) are available to students studying for the master of science degree in dentistry. Applications should be sent to the dean.

Graduate division: Tuition, $300; activity fee, $9; photograph, $1; laboratory fee, $20; graduation fee, $25.

Refresher courses: For those requesting brief reviews one to four weeks in length (rotate): A. Prosthetics. B. Oral surgery. C. Crown and bridge. D. Practice management. E. Diagnosis and x-ray. F. Anesthesia. G. Others upon special request.

Postgraduate: For those desiring to specialize in one subject without degree (one-three semesters). A. Orthodontia. B. Prosthetics. C. Oral surgery. D. Periodontia. E. Pedodontia. F. Dental medicine. G. Others upon special request.

Graduate: For those desiring an M.S. in dentistry (two-three semesters of full schedule required). A. Anatomy and histology. B. Physiology and pharmacology. C. Bacteriology. D. Material and biochemistry. E. Pathology. F. Others upon special request. G. Plastic surgery.

School of Dentistry, Saint Louis University, St. Louis 4, Thomas E. Purcell, Dean.

Plans for refresher courses being developed.

School of Dentistry, Washington University, St. Louis 10, Benno E. Lischer, Dean.

Plans for refresher courses not yet completed.

Nebraska

School of Dentistry, Creighton University, Omaha 2, Herbert E. King, Dean.

With a minimum of two weeks' attendance, a review of the subject of full denture construction is offered to graduate dentists. This would be expected to cover the fundamentals by conference with the instructors and one or more practical cases carried on under close supervision. The outline course here suggested is subject to adjustment to individual needs and may be expanded if more time is avail-

able. Further courses might be given on demand in partial denture methods.

Full dentures: Two weeks. Two hours in conference on patient diagnosis, mouth examination and review of patients in the clinic. A patient assigned and steps as follows carried through by the student dentist under supervision. A conference and round table with instructors on the case after completion.

Exodontia, anesthesia, pyorrhea, radiology: 1. Introduction. Lectures on minor and major oral surgery. 2. Radiology. The technic of exposing, developing, and mounting dental x-ray films will be presented concisely. Practical instruction in dental clinic and dark room will be included. The use of bitewings in early diagnosis of caries and diagnosis of pathologic conditions will be studied. 3. Exodontia; anesthesia, local and general. Instruction to include essentials of anatomy, practical points in instrumentation and asepsis and the drugs employed. Practical instruction in the clinic which will permit each student to operate under the supervision of the instructor. 4. Pyorrhea treatment. The diagnosis, etiology and treatment of gingival tissues will precede a clinical course in the elimination of pyorrhea pockets. The surgical treatment of pyorrhea pockets will be emphasized and discussed. Postoperative treatment and home care will also be given attention. 5. Pharmacology. Discussion and use of different drugs in the dental office. Lectures on penicillin and the drugs of the sulfa group. This will also include prescription writing. 6. Laboratory instruction on the face and jaws will be offered although the time is limited for extensive study in this field.

College of Dentistry, University of Nebraska, Bert L. Hooper, Dean.

A six weeks course covering oral surgery and prosthodontics (complete denture construction) beginning September 24, 1945 and ending November 3, 1945. A six weeks course in operative dentistry and prosthodontics (partial dentures, fixed and removable) beginning November 5, 1945 and ending December 15, 1945. A six weeks course in dentistry for children beginning February 4, 1946 and ending March 16, 1946.

New York

School of Dental and Oral Surgery, Columbia University, New York 32, Bion R. East, Associate Dean.

In response to requests from members of the dental profession now serving in the dental corps of the Army and Navy and on the basis of returns received from a questionnaire sent to the more than 500 alumni of the School of Dental and Oral Surgery of the Faculty of Medicine, now in service in all parts of the world, Columbia University is offering a program of postgraduate and refresher courses in dentistry.

No academic degrees will be conferred in this series. Certificates of proficiency in dentistry or in a special branch of dentistry will be granted to properly qualified students. The course of study of the certificate of proficiency covers an academic year and includes not less than forty-eight trimester credits of special work in the clinical branches, and the preparation of an acceptable thesis.

The university reserves the right to withdraw or modify the courses or to change the instructors at its discretion. Only qualified students will be permitted to register. The university retains the right to determine the adequacy of each student's qualifications.

Anatomy Ce315: A one-week course in anatomy, five two-hour periods. The course will consist of lectures, discussions and demonstrations. Wet specimens and prepared dissections are used for demonstration purposes. In this review of anatomy, emphasis is placed on structural relationships and the application in oral surgery, orthodontics, prosthetics, roentgenology and the general practice of dentistry. Course will begin November 5, 1945. Registration limited to fifteen students. No credit.

Diagnosis Ce316: A two-weeks course in diagnosis. Ten lectures of two hours each. This course will present an orderly procedure in the charting of a patient's mouth, including examination, history-taking diagnosis and treatment-planning. Various diseases of the dental pulp will be discussed from the standpoint of clinical pulp symptomatology. A new method of pulp diagnosis with the use of an improved electrical tester will be demonstrated. Instruction will be given in dental x-ray interpretation. Diseases of the gingivae and oral mucous membranes will be presented with special stress on the signs, symptoms and methods of differentiation. Procedure in comprehensive diagnosis will be included. This

course will start January 7, 1946. No credit.

Operative Ce317: A five-weeks full time course in operative dentistry. The course will consist of lectures, demonstrations and clinical practice and will consider the use and physical properties of gold foils, gold inlays, amalgam restorations, porcelain inlays, silicates and acrylic inlays. This course will start October 22, 1945. No credit.

Operative Ce338: A course in operative dentistry, two three-hour periods each week during the academic year. The course will consist of demonstrations and clinical practice in the subject matter described in Ce317, and will begin September 20, 1945. No credit.

Orthodontics Ce328: A two-weeks full time course in orthodontics. This course is designed to give instruction in the technic of assembling and manipulating the edgewise arch mechanism. The principles and methods of treatment of malocclusion, as advocated by Charles Tweed, will be presented in correlated form. The course will begin on January 27, 1946. No credit.

Orthodontics Ce329: A one-week full time course consisting of lectures, informal conferences and technical training in the construction of bands, the lingual arch and the twin wire mechanism. The technic of assembling and manipulating the twin wire mechanism will be taught. The course will begin February 18, 1946. No credit.

Orthodontics Ce330: A one-week full time course in orthodontics. This course will consist of lectures, conferences and technical training in the lingual-labial arch mechanism. Instruction will be given in the basic principles of treatment associated with this appliance for the correction of malocclusion. Date to be announced. No credit.

Orthodontics Ce341: Four weeks. An intensive course in the principles and technics of orthodontics, designed especially to give returning servicemen who were qualified practitioners of this specialty an opportunity to review the philosophy and technics of orthodontic treatment. Admission to this course at the discretion of the Orthodontic Division. Date to be arranged. No credit.

Oral Pathology Ce318: A two-weeks full time course in oral pathology. This course will review the clinical pathology of the oral cavity. It will consist of lectures, discussions and laboratory work dealing with: inflammation, diseases of the soft tissues, diseases of the pulp and periapical tissue, periodontoclasia, disease of the mandible and maxilla, bone dystrophies, oral neurology, cysts and tumors. Registration limited to fifteen students. This course will start January 21, 1946. No credit.

Pedodontics Ce319: A two-weeks full time course in pedodontics. This course will consist of lectures, demonstrations and clinical practice. Group discussions pertaining to juvenile dental patients, and practical applications of didactic material will be included. Opportunity will be given for an extended period of clinical practice on application. The course will start September 10, 1945. No credit.

Periodontology Ce320: A two-weeks full time course in periodontology. Lectures, demonstrations and clinical practice in periodontology will include the practical aspects of examination, recording, diagnosis, instruction in home care, treatment of gingivitis, periodontoclasia, Vincent's infection and occlusal defects affecting the periodontal tissues through trauma; the symptomatology of local and systemic conditions affecting the gingivae, and the histology, pathology, bacteriology and physiology of the periodontal tissues and structures and their systemic relationships. This course will start on June 3, 1946. No credit.

Periodontology Ce332: A course in periodontology. One afternoon a week for thirty weeks. The same subject matter as in Ce320. This course will start October 1, 1945. No credit.

Full Dentures Ce321: A six-weeks full time course in full denture prosthesis. This course consists of lectures, demonstrations and clinical practice. The student will be assigned a patient for whom he will construct full dentures and another for whom he will prepare an immediate denture. Cases are to be constructed on the anatomic articulator. This course will start September 10, 1945. No credit.

Full Dentures Ce322: A two-weeks full time course in full denture prosthesis consisting of concentrated clinical practice. The student will be assigned an edentulous patient. The case will be constructed on an anatomic articulator. The course will start on December 3, 1945. No credit.

Partial Dentures Ce323: A four-weeks full time course in the construction of partial dentures. This course will consist of lectures, demonstrations and clinical practice. The emphasis will be on partial denture design in

relationship to fixed and mobile appliances, and laboratory procedures such as duplicating and surveying models and skeletal construction. Each student will be assigned a patient for whom he will complete all the procedures in a partial denture restoration. This course will start January 7, 1946. No credit.

Crown and Bridge Ce324: A two-weeks full time course in crown and bridge. This course will consist of seminars, demonstrations and clinical practice in the construction of fixed bridges. Tooth preparation, abutment and pontic construction and assemblage and consideration of the uses of acrylic resins will be stressed. The student will be assigned a patient for whom he will construct a bridge. An extension of the period of clinical practice may be arranged. This course will start February 11, 1946. No credit.

Surgical Prosthesis Ce325: A two-weeks full time course in surgical prosthesis. Lectures, demonstrations and laboratory practice in the construction of obturators for cleft palates and special restorations for missing parts of ears, noses or eye sockets. The course includes instruction in making moulages. The course will start on February 25, 1946. No credit.

Crown and Bridge Ce337: A course in fixed partial replacements (crown and bridge). Two three-hour periods a week during the academic year. The course will consist of demonstrations and clinical practice in the construction of fixed bridges. Tooth preparations, abutment and pontic construction and assemblage and consideration of the uses of acrylic resins will be emphasized. Each student will be assigned patients for whom he will construct the bridges in all phases. The course will start September 20, 1945. No credit.

Partial Dentures Ce336: A course in partial (clasp) dentures. Two three-hour periods each week during the academic year. The course will consist of concentrated clinical practice. Emphasis will be given partial denture design in relationship to fixed and mobile appliances. Such laboratory procedures as duplicating and surveying models and skeletal construction will be demonstrated. Each student will be assigned patients for whom he will construct entire cases. The course will start September 20, 1945. No credit.

Full Dentures Ce335: A course in full denture prosthesis. Two three-hour periods each week during the academic year. Concentrated clinical practice. Students will be assigned edentulous patients for construction of dentures using an anatomic articular. The course will start September 20, 1945.

Surgical Prosthesis Ce339: A course in surgical prosthesis leading to a certificate of proficiency. Full time, one academic year. A minimum of forty-eight credits in prescribed subjects and an acceptable thesis will be required. Instruction will include assignments in the basic sciences, in clinical dentistry and in the surgical prosthesis clinic. The student will have an opportunity for practice in the construction of obturators for cleft palates and special restorations for missing parts of ears, noses or eye sockets. Instruction in moulage making will also be given. The course will start September 20, 1945.

Surgical Prosthesis Ce340: A course in surgical prosthesis. Two three-hour periods each week during the academic year. The course is designed to acquaint the student with the methods of treatment of intra-oral deformities. Appliance therapy will be demonstrated and the student will have the opportunity for technic experience and clinical practice in the construction of obturators, stents, intra-oral splints and rhinoplastic devices. Instruction will be given in the construction of moulages. The course will begin September 20, 1945. No credit.

Surgery Ce327: A five-weeks full time course in surgery. This course will consist mainly of demonstrations and clinical instruction in the removal of teeth and the administration of local anesthesia. The principles underlying the application of forceps and elevators will be taught. The eradication of dental foci of infection, alveolectomy and other related procedures are included. The course will be amplified with seminars and clinical discussions. Class limited. This course will start on September 24, 1945. No credit.

Surgery Ce334: A course in oral surgery leading to a certificate of proficiency in oral surgery. Full time, one academic year. This course is offered to qualified individuals wishing advanced instruction in this specialty. A minimum of forty-eight trimester credits in prescribed subjects and an acceptable thesis will be required. Instruction will include special assignments in the basic sciences, in clinical medicine and surgical prosthesis. The student will attend the oral surgery clinic for observation and practice. Class limited. The course will start on September 20, 1945.

For schedule of fees and further informa-

tion, address the Registrar, School of Dental and Oral Surgery of the Faculty of Medicine, Columbia University, 630 West 168th Street, New York, N. Y. Arrangement of additional short courses will be considered on specific demand.

College of Dentistry, New York University, New York 10, Dugald E. S. Brown, Chairman of the Executive Faculty.

Program not to be initiated until 1946.

School of Dentistry, University of Buffalo, Buffalo, Russell W. Groh, Dean.

Refresher courses of one week duration are being planned in oral surgery, prosthetic dentistry and crown and bridge construction.

Ohio

College of Dentistry, Ohio State University, Columbus 10, Wendell D. Postle, Dean.

Refresher courses offered in orthodontics, oral surgery, x-ray, periodontia, prosthodontics, crown and bridge, operative dentistry, root canal therapy, clinical oral pathology and removable partial denture prosthesis.

School of Dentistry, Western Reserve University, Cleveland 6, William L. Wylie, Dean.

Refresher courses announced for 1945-1946 as follows: Root canal therapy, January 21-25, $50; oral pathology, March 11-15, $50; gold inlays, March 18-22, $65; fixed bridge prosthesis, March 18-22, $75; full denture prosthesis, March 18-22; $50.

It is hoped that additional refresher courses may be announced at a later date.

Opportunities for advanced study in dentistry are offered through the graduate school of the university. The relationship of the school of dentistry to other departments of the university and its associated hospitals assures unusual opportunities for research in dentistry and the relation and application of the basic sciences to clinical dental practice.

Oregon

Dental School, University of Oregon, Portland 14, Ernest E. Starr, Acting Dean.

Postgraduate and refresher courses covering one school year in length are offered in oral surgery, orthodontia, prosthetic dentistry, operative dentistry and special pathology.

Special short refresher courses ranging in length from two weeks to four months have also been arranged. These short courses are calculated to cover work in which the practitioner, who has been out of college a few years, may wish to improve his training or to obtain new light in some particular field.

Tuition for special refresher courses includes matriculation fee of $5 and tuition of $300 for the full session of thirty-two teaching weeks. Minimum tuition fees for shorter courses are $75 for two months or less. The tuition charge for more than two months will be a regular proportion of the annual tuition fee for a full session. It will be the policy of the dental school of the University of Oregon to arrange courses to meet the requirements of the individual student.

The regular schedule follows: July 6 and 7, registration; July 9, all classes begin; October 7, end of semester; October 29, semester begins; November 29, Thanksgiving holiday; December 23, Christmas vacation begins; January 2, 1946, classes resume; February 27, end of semester; March 4, new semester begins.

Pennsylvania

School of Dentistry, Temple University. Philadelphia 30, Gerald D. Timmons, Dean.

No courses offered at present.

The Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, Philadelphia 4, J. L. T. Appleton, Dean.

Plans are now under way for postgraduate courses to be given under the auspices of this school in the fields of oral surgery and anesthesia, prosthetics (including full and partial dentures, and crown and bridge work), children's dentistry, ceramics, public health dentistry, roentgenology, operative dentistry, oral medicine (including periodontia), endodontia (pulpless tooth management), bacteriology, oral pathology, etc. These courses will be offered within the next few months to run either concurrently or consecutively.

Besides this, under the auspices of the graduate school of medicine, there will be offered graduate courses lasting for at least one

academic year in the following fields: oral surgery and anesthesia, oral medicine (including periodontia), prosthetics (including full and partial dentures, and crown and bridge work) and orthodontia.

The postgraduate course in endodontia is scheduled to start September 5, 1945. The amount of time allotted to it is sixty-six hours. Tuition fee probably will be $150. Since it meets only once a week, there will be no living expenses. The times at which the other postgraduate courses will start have not yet been determined. Some of them will require ninety hours and others forty-five hours. Tuition will probably run from $100 to $250.

The only graduate course which will be offered this fall will be that in oral surgery and anesthesia. Tuition is $800. Living expenses would probably run between $1,000 and $1,500.

Tennessee

School of Dentistry, University of Pittsburgh, Pittsburgh 13, H. Edmund Friesell, Dean.

Special courses not to be established until the end of the war.

School of Dentistry, Meharry Medical College, Nashville 8, M. Don Clawson, President.

The next course will be held during the week of September 18 at Meharry. The subject will be "Full and Partial Dentures, Crown and Bridge." Attendance will be limited to 20 men and the fee will be $25 for the one-week course. Board and room are available at regular community scale.

College of Dentistry, University of Tennessee, Memphis 3, R. D. Dean, Dean.

Plans under way, but no special courses to be offered in the next academic year.

Texas

College of Dentistry, Baylor University, Dallas 1, George L. Powers, Dean.

No plan yet developed.

School of Dentistry, University of Texas, Houston 4, Frederick C. Elliott, Dean.

No formal plan for this education has yet been devised which would be suitable for publication.

Virginia

School of Dentistry, Medical College of Virginia, Richmond, Harry Bear, Dean.

Graduate fellowships are now being offered whereby a graduate devotes approximately one-half of his time to clinical instruction and the other one-half to a study in one of the basic science courses. This fellowship provides for compensation of $100 a month on a twelve-month basis. Fellowships are available for the term beginning July 9, 1945. There are also graduate courses in the basic sciences under this general program. This work leads to a degree of master of science. The fees vary according to the subjects taken in a given term.

Wisconsin

Dental School, Marquette University, Milwaukee 3, George W. Wilson, Dean.

The Marquette University Dental School announces a series of refresher courses generally, although not entirely, limited to returning veteran dentists of the armed forces. According to present plans, the first of the series will be offered early in November. It will be of six weeks continuous duration. The next of the series will be offered early in 1946 if the demand is sufficient.

The courses are offered primarily as an educational service to the returning veteran. They are designed to give him a general refreshing in dental technic and related clinical and basic science subjects. Courses will include some new technics, but in general they will be a review of basic procedures in dental practice.

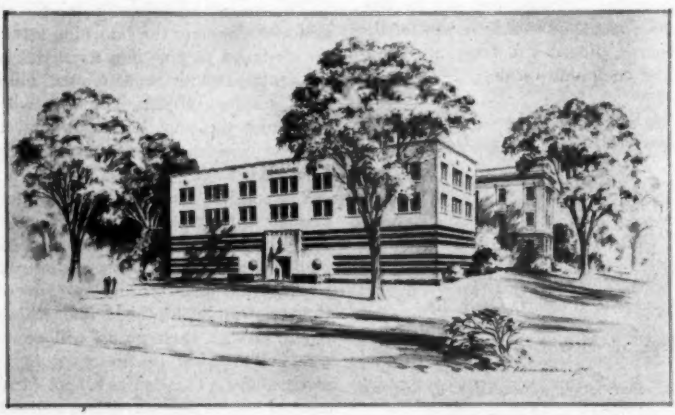
The subject matter of the courses will be divided into three general groups; namely oral surgery, prosthetic dentistry including complete and partial denture construction and fixed partial dentures and operative dentistry. Courses will be arranged and schedules prepared so that each group will consume two weeks. They will be presented in the order given above. The dental school faculty, augmented by dentists, physicians and others who are well known in special fields, will present the courses.

Classes will be limited to fifteen dentists. No course will be given with a registration of less than ten. The cost of the full six-weeks course will be $150. Any dentist student desiring to take only one or two of the three divisional groups may do so. The cost for each will be $55. Instruments and operating and laboratory gowns will be furnished by the student. Materials, except gold, and other equipment will be furnished by the school. Application forms will be furnished on request to the Secretary of the Faculty, Marquette University Dental School, 604 North 16th Street, Milwaukee 3, Wis.

"PROVISIONAL APPROVAL" GRANTED TO COLLEGE OF DENTISTRY, BAYLOR UNIVERSITY, DALLAS

The Council on Dental Education announces that, as the result of a recent resurvey, provisional approval has been given to the College of Dentistry of Baylor University at Dallas, Texas. The college suffered an interruption in its customary procedure a year ago when the college of medicine was moved to Houston. Up to that time, the basic science instruction for dental students had been given by the medical faculty. It was necessary to recruit a new staff for this purpose and to equip laboratories for carrying on the work. The main activities of the university are carried on at Waco. The units that are at Dallas now consist of the Baylor Hospital, the School for Nurses and the College of Dentistry.

The president and trustees of the university have determined to erect a new clinical building for dentistry adjacent to the Baylor Hospital. The accompanying sketch of the proposed new building shows the wing of the hospital at the right, with which the dental building will be connected. In this wing of the hospital, provision will be made for the teaching of the basic sciences. The new clinical building and the remodeling of the hospital wing will entail a cost of about $1,000,000. It is expected that work will begin on the new building as soon as materials are available.—*Harlan H. Horner, Secretary.*



Proposed new clinical building, College of Dentistry, Baylor University.

COUNCIL ON DENTAL THERAPEUTICS

PROGRAM OF PROFESSIONAL EDUCATION OF THE COUNCIL ON DENTAL THERAPEUTICS

The Council on Dental Therapeutics has authorized publication of the following report.—*Donald A. Wallace, Secretary.*

It is essential to the success of the work of the Council on Dental Therapeutics that the members of the American Dental Association understand the significance of its activities. In order to bring about a better understanding of the functioning of the Council and also a better knowledge of the significance of the Seal of Acceptance, a definite program of professional education has been conducted by the Council for many years. During the past year, this program has been intensified. THE JOURNAL, the office of the Business Manager and the Bureau of Public Relations have cooperated closely with the Council in this effort.

The educational program will be divided into several phases, which will be discussed separately in this article.

Informative Articles

One of the principal functions of the Council is the publication of articles that keep the members of the Association informed with regard to therapeutic developments. These may be reviews of current knowledge or they may deal with the merits of individual products or with classes of products. Recent examples of these three types of articles are "Penicillin Progress" (J.A.D.A. 31:1379, October 1, 1944); "Lavoris—Not Acceptable for A.D.R." (J.A.D.A. 31:1679, December 1, 1944), and "Ultraviolet Lamps for Air Disinfection—Not Acceptable for A.D.R." (J.A.D.A. 31:1124, August 1, 1944).

Notices in the Advertising Section of The Journal

These notices in the advertising section of THE JOURNAL were designed to illustrate certain features of the Council's work in dramatic form. Their general theme has been that Council-accepted products as a class are safe, effective and truthfully advertised and that the Seal of Acceptance is a mark setting aside products of quality which can live up to the claims made for them. This is a relatively new phase of the educational program.

Talks to Dental Students

During the past twelve months, an effort has been made to have a representative of the Council, usually the secretary, appear before the junior and senior classes or, in some instances, the entire student body of every dental school in the country. In these talks, the Council's work is presented by many specific examples. It is made clear to the students that the standards established by the Council are of a definite practical significance. It is hoped that it will be possible from now on for every dental student to hear at least one such talk during his academic career. The undertaking involves a considerable, but not unreasonable amount of travel. On the basis of the response to date, the talks appear to be worthwhile.

Talks to State and Local Dental Society Groups

The secretary of the Council has appeared before many state and local dental society groups during the past year. When talks are scheduled to students, an effort is usually made to appear before the dentists in the community where the school is located. A talk was given to the State Dental Society Officers on the occasion of their October 1944 meeting in

Chicago. The response indicates that the membership of the Association is interested in the Council's objectives and appreciates the opportunity to learn more in detail what the Council is doing and why.

Advertising and Commercial Exhibit Policy

For many years, the American Dental Association has granted advertising and commercial exhibit space only to those products coming within the scope of the Council which are acceptable. Many of the state and local societies have adopted a similar policy, as expressed in the following resolutions:

Whereas, it has long been recognized that the use of therapeutic agents which have not been shown to be useful and safe or for which unsubstantiated claims are made is harmful both to the public and the dental profession, and

Whereas, the American Dental Association has for many years maintained a Bureau of Chemistry and Council on Dental Therapeutics for the purpose of evaluating therapeutic agents and enlightening the profession as to its findings, and

Whereas, the full benefit of the Council's work can only be realized when all publications and meetings of organized dentistry restrict the use of their advertising and exhibit facilities to those products coming within the purview of the Council that are acceptable to the Council, therefore be it

Resolved that the following statement be adopted as the official policy of this organization in respect to such products: "Products coming within the scope of the Council on Dental Therapeutics of the American Dental Association must be acceptable to the Council to be exhibited at any of our meetings or advertised in any of our publications," and be it further

Resolved that copies of this resolution be sent to the editor of our official publication, the manager of the commercial exhibits and to the Council on Dental Therapeutics of the American Dental Association.

The following societies have adopted the policy without qualification: Arizona State Dental Society, Chicago Dental Society, Cleveland Dental Society, Delaware State Dental Society, Detroit District Dental Society, District of Columbia Dental Society, Georgia Dental Association, Hudson County Dental Society, Illinois State Dental Society, Iowa State Dental Society, Maine Dental Society, Maryland State Dental Association, Massachusetts Dental Society, Michigan State Dental Association, Minneapolis District Dental Society, Minnesota State Dental Association, Missouri State Dental Association, Nebraska State Dental Association, Nevada State Dental Association, New Hampshire State Dental Association, New Jersey State Dental Society, New York State Dental Association, North Carolina State Dental Society, Odontological Society of Western Pennsylvania, Ohio State Dental Society, Oklahoma State Dental Society, Oregon State Dental Association, Pennsylvania State Dental Association, Rhode Island State Dental Society, St. Louis Dental Society, Tennessee State Dental Society, Texas State Dental Association, Vermont State Dental Society, West Virginia State Dental Association and Wisconsin State Dental Society.

The following societies have adopted the policy with regard to their journals, but have not yet adopted it with regard to commercial exhibits, according to the records of the Council office: California State Dental Association, Colorado State Dental Society, Kansas State Dental Society, North Dakota State Dental Society, South Dakota State Dental Society and Virginia State Dental Association.

The following societies have adopted the policy with regard to commercial exhibits only: Kentucky State Dental Association and Mississippi State Dental Association.

Many other state and local societies have followed the A.D.A. standards partially, thus providing assistance to the program to a degree. The rational basis for restriction of advertising and com-

mercial exhibits lies in the fact that almost all products which are worth while and which will do what is claimed for them can be accepted by the Council on Dental Therapeutics.

Unless products are accepted by the Council, it is not fair to the dentists who read their journals or attend the commercial exhibits at dental meetings to be exposed to sales pressure on behalf of such unaccepted products. When a dentist sees a product advertised in his journal or exhibited at a society-sponsored meeting, he should have assurance that the product is dependable.

The cooperation of the societies listed above is deeply appreciated by the Council. They are playing fair with their membership and with the public which their membership serves.

Correspondence

During the past year, the number of individual requests for information from dentists has increased. These inquiries help to keep the Council informed regarding the therapeutics problems that confront the dentists in practice. A practicing dentist does not always have easy access to published information and, in these busy times, he sometimes cannot find time for much scientific reading. Inquiries addressed to the Council are always welcomed.

ARTICLES INCLUDED IN LIST OF ACCEPTED DENTAL REMEDIES

The Council on Dental Therapeutics of the American Dental Association announces the inclusion of the following articles in the list of Accepted Dental Remedies.

*Dentifrices**

Howard's Tooth Powder: Composition: See Sheffield Tooth Powder (A.D.R. Ed. 10, p. 103).

Manufactured by the Sheffield Company, New London, Conn. Distributed by Mack Drug Company, Hackensack, New Jersey.

Sodium Chloride Powder-Mallinckrodt: A brand of sodium chloride U.S.P. powder.

Manufactured by Mallinckrodt Chemical Works, St. Louis, Mo.

Admission of a product to the list of Accepted Dental Remedies means that the product and the methods by which it was marketed at the time of consideration were not found to be in violation of the Council's published rules. Accepted products are reconsidered periodically. The files of the Council contain information on many drugs and dental cosmetics. All information is available, upon request, and inquiries are welcomed. A postal card inquiry will bring a prompt reply.—*Donald A. Wallace, Secretary.*

NOTICES OF JUDGMENT

1164. Misbranding of oxygen-carbon dioxide mixture. U. S. v. Stuart Oxygen Co. Plea of nolo contendere. Fine, $300. (F.D.C. No. 10603. Sample Nos. 13894-F, 14167-F, 39332-F.) (Issued June 1945.) On December 16, 1943, the United States attorney for the Southern District of California filed an information against the Stuart Oxygen Co., a corporation, Los Angeles, Calif., alleging shipment of quantities of the above-named product from the State of California into the State of Arizona on or about July 14, 1942, and April 7 and May 11, 1943.

*A.D.R. Ed. 10, p. 95.

The article was alleged to be misbranded in that the statements appearing on the labeling of one portion of the article, which represented and suggested that it contained not less than 5 per cent of carbon dioxide, and on the labeling of the remainder, which represented and suggested that it contained not less than 10 per cent of carbon dioxide, were false and misleading since the article contained, in the case of the former, not more than 3.5 per cent of carbon dioxide, and, in the case of the latter, not more than 7.4 per cent of carbon dioxide.

On February 14, 1944, the defendant having entered a plea of nolo contendere, the court imposed a fine of $100 on each of three counts.

1194. Misbranding of tooth powder. U. S. v. 182 packages and sixty-one packages of Tooth Powder. Default decree of condemnation and destruction. (F.D.C. No. 10304. Sample No. 42460-F.) (Issued June 1945.) On August 4, 1943, the United States attorney for the Western District of Washington filed a libel against 182 ¾-ounce packages and sixty-one 3-ounce packages of tooth powder at Seattle, Wash., alleging that the article had been shipped on or about October 9, 1942, and March 17, 1943, from Long Beach, Calif., by the Frenco Laboratories; and charging that it was misbranded. The article was labeled in part: "Frenco's Papaya Tooth Powder."

Examination of samples disclosed that the article consisted essentially of calcium carbonate and inactive papain.

The article was alleged to be misbranded in that the statement appearing upon its label, "The danger of Pyorrhea may be greatly diminished by packing the teeth overnight with a paste made from the powder," was false and misleading since the article would not be effective in the prevention of pyorrhea.

On April 28, 1944, no claimant having appeared, judgment of condemnation was entered and the product was ordered destroyed.

COMMITTEE ON LEGISLATION

ILLINOIS, INDIANA AND NORTH CAROLINA ENACT LEGISLATION TO LICENSE DENTAL HYGENISTS

Illinois, Indiana and North Carolina have enacted legislation to license dental hygienists in recent months, during the 1945 sessions of their legislatures. A similar bill was introduced in Oregon, but failed to pass.

All three laws provide in general that the hygienist shall practice under the supervision of a licensed dentist, that licenses can be revoked under certain circumstances and that the hygienist is permitted to practice in the office of the dentist, in public schools and in clinics of state institutions. Illinois and North Carolina limit the number of dental hygienists to one per dentist in private practice. North Carolina and Indiana permit practice in the clinic of an industrial establishment.

In Illinois, an applicant for a license must be a citizen of the United States or must possess first papers. She must be a graduate of a high school and have two years of credit in a school of dental hygiene. Biennial reregistration, at a fee of $2, is required. The act states that "dental hygienists may remove the stains or concretions (accretions) from the exposed surfaces . . . but shall not diagnose in addition or perform any other operation on the human teeth or tissues of the jaw."

The Indiana law provides that a certificate shall be issued to successful candidates. Before entering practice, the applicant must apply to the secretary of the board for a permit to practice in a designated location. Annual reregistration is required at a fee of $2.

The act defines the term hygienist in the following manner:

Any person shall be deemed to be practicing

dental hygiene within the meaning of this Act who: (a) uses the title "Dental Hygienist" or the letters "D.H." in connection with her name; or (b) holds herself out to the public in any manner whatsoever that she can or will render services as a dental hygienist; or (c) removes calcific deposits or accretions from the surfaces of human teeth or cleans or polishes such teeth; or (d) removes rough and overhanging margins of fillings; or (e) makes instrumental examination of her patient's teeth; or (f) charts the result of such examination and findings; or (g) makes x-ray pictures of the teeth and jaws; or (h) applies and uses within the patient's mouth such antiseptic sprays or washes as her employer dentist may direct; or (i) assists in the administration of dental anesthetics; or (j) engages in any of the practices within the oral cavity that are included in the curricula of recognized schools of dental hygiene.

The North Carolina act requires that an applicant be of good moral character, be over 19 years of age and have full citizenship. The applicant must also be a high school graduate and have completed successfully training in a school of dental hygiene. Annual reregistration is required at a fee of $2.

The act defines dental hygiene as "the treatment of human teeth by removing therefrom calcareous deposits and by removing accumulated accretion from directly beneath the free margin of the gums and by polishing exposed surfaces of teeth.—*George H. Fox, Secretary.*

CASES AND COMMENTS

The Dental Curriculum

To the Editor: The history of dentistry reveals that, for more than a hundred years, this branch of the healing arts has made tremendous progress under the leadership of scores of outstanding men. The dental curriculum has been planned with the express idea that dental graduates are to enter civilian practice rather than to specialize and do investigative work. In this day and age of scientific research, dentistry must keep pace or yield its leadership to allied professions, which may have to step in and conduct dental investigations. The question is often asked: Why are so few dentists specializing and conducting scientific research?

The answer is simple. After two years of predentistry and four years of dentistry, a young man is prepared professionally, but academically he is still an undergraduate. If he wishes to specialize, he may take one year of undergraduate work in a science and liberal arts college and receive a B.S. degree; spend three years in a graduate school and study for a M.D.S. degree, or seek admission to a medical school as a freshman, provided he has taken premedicine instead of predentistry in his preparatory training. If not, he may have to start as a premedical freshman.

These facts point to one thing: the doors to rapid progress in specialization have as yet not been opened to the dentist. The dental curriculum must be revised to comply with the requirements of higher education and thus afford to dentists an opportunity to specialize and to develop the scientific phases of dentistry.

To correct the present situation, the following changes in the dental curriculum are proposed:

1. The predental requirements should be the same as the premedical. Exception may here be taken to the German language requirement, since more important contributions to dentistry are being made in the Scandinavian countries and published in the Scandinavian languages. In the present stage of this new curriculum, preference should be given to the Danish, Norwegian or Swedish language. German may be chosen by those who plan to matriculate in a medical school to study for the M.D. degree and specialize in oral surgery.

2. The basic science courses in dentistry should be the same as for medicine, and

thus transferable to the medical school. These courses are anatomy, general bacteriology, physiologic chemistry, histology and embryology, general pathology, physiology and pharmacology. This program would give the dental student sufficient senior college credits so that the science and liberal arts college would grant him the B.S. degree at the end of the junior year in dentistry.

3. Training in dental technic and clinical dentistry would proceed as at present with changes from time to time as the clinicians see fit. Upon satisfactory completion of four years in dentistry, the student would be awarded the degree of doctor of dental surgery. He would then be eligible to take the dental state board examination in the state in which he chooses to practice.

The dentist thus prepared has the following opportunities:

1. He may practice his profession.

2. He may enter the graduate school and study for an M.S. degree in one of the basic dental sciences. This program would require a minimum of three quarters. He may continue his studies in his chosen field of interest, and, upon satisfying the requirements, receive the Ph.D. degree, the study for which would require a minimum of six additional quarters. Such a training would qualify the dentist to teach dental students in the basic science of his choice and to conduct research.

3. He may matriculate in the graduate school and study for the M.D.S. degree. This training would require a minimum of six quarters. The requirements for this degree would be basically the same as for the M.S. degree, but with half of the student's time devoted to intensive study and training in one phase of clinical dentistry. Such a training would prepare a man for teaching and for research work in his field of interest in clinical dentistry, or for the practice of dentistry as a specialist in his field.

The requirements for the above-named graduate degrees are defined in the graduate school bulletin, and it should be the duty of each graduate student's adviser to plan the student's work so that all these requirements shall be met.

4. The dentist may transfer to the medical school and complete the requirements for the degrees of B.M. and M.D. This course can be completed in three years, and the student would devote one-third of his time each year to special oral surgery and plastic surgery of the face. Thus, upon completion of this program, the dentist would be an oral surgeon recognized by any hospital. If this candidate wishes to take a medical state board examination and practice medicine, an additional one-year internship would be required.

Oral surgeons thus trained are in demand in civilian practice by the thousands. It is a field that is greatly neglected. A few outstanding oral surgeons thus trained are needed in our dental schools, particularly if such a graduate program should be adopted.

How will such a modified dental curriculum affect dentistry?

1. It will raise the standard of dentistry. Dentists will have a broader vision and a better understanding of the relationship of systemic pathology to oral pathology. Dentistry would have, after this program has been in effect for some time, a group of men who will have specialized in one or more of the following branches of dentistry: restorative dentistry, oral pathology, orthodontia and surgery. The public would then receive better care, even than at the present time, since special cases may then be referred to specialists.

2. It will raise the dignity and prestige of the profession among allied professional men.

3. Such a curriculum would be a challenge to scholars, and the dental schools would get a better quality of students. Medical schools with high standards are not in want of students. Graduate schools are, during normal time, overfilled with students with I.Q.'s ranging from 120 to 165 plus. The high hurdles attract the best high jumpers.

A. P. Lund, Ph.D., D.D.S.
C. A. Griffith, D.D.S.
C. E. Rudolph, D.D.S.
A. S. Wells, B.A., D.D.S.
Minneapolis, Minn.

Netherlands Seeks Dental Journals

To the Editor:

With the war in Europe over and com-

munications starting to function again, it is now possible to receive the answers to many questions.

It was in 1943 that I submitted the Ivory Cross Expedition plan to the Netherlands Government, but not before 1945 could my colleagues in the Netherlands receive the full contents.

The two leading professional men in Holland, Dr. Charles F. L. Nord, editor of the *Netherlands Dental Journal* and secretaire-general of the *Fédération Dentaire Internationale* (F.D.I.), and Dr. A. L. J. C. van Hasselt, president of the Netherlands Dental Association and vice-president of the F.D.I., cabled me: "The Ivory Cross plan is splendid, but it is impossible this year on account of the traffic conditions. Prepare for next year."

Shortly after the liberation of the Netherlands, when telegraphic communications reopened, I sent a cable to the secretary of the Amsterdam section of the Netherlands Dental Association of which group I was president for several years. That was on May 24. It took until July 5 before this secretary, my friend Dr. Edgar Mynarends, returned the good wishes. In my telegram, I had asked: "What can I do for colleagues?" I expected to read: "Send us food and dental materials," but no, "If possible send dental journals."

Having lived under that terrible strain for five long years and still going on a meager diet of 2,000 calories a day, the first thing these brave boys demonstrate is how much they have missed the American contacts—how much they have missed the American dental journals.

Therefore I am now going to ask for 500 volunteers to meet 500 Dutch dentists! The volunteer's task will be to send 1 pound of printed matter consisting of dental literature, covering the last three years, to a Dutch dentist, the name of whom he can obtain by writing to me, 689 Massachusetts Ave., Cambridge 39, Mass.

Postal regulations allow 1 pound a week to each addressee at a rate of 12 cents a pound.

Here is where the Dental Ambassador of Good Will comes in: Your friend from the Netherlands will answer and thank you and in this way a friendship develops.—*Herbert Loeb, D.D.S.*

Report of the Kansas EMIC Dental Test Program

Leon R. Kramer, D.D.S., M.S.P.H., Topeka, Kan.*

The Kansas Emergency Maternity and Infant Care Dental Test Program has now been in operation since October 1, 1944.† The purpose of the program is to supply emergency dental care to pregnant wives of service men in the lower four pay grades whose cases have been approved by the Kansas Emergency Maternity and Infant Care Program. The data on the first nine months' operation of this program are given in the accompanying table.

Data on EMIC Dental Test Program

	No. Cases Approved EMIC	No. Applications for Dental Services	No. Received Dental Care	Cost of Dental Care
October	746	25	6	$ 28.00
November	559	50	12	63.00
December	670	56	20	118.00
January	780	72	11	63.00
February	580	61	15	56.00
March	672	67	6	26.00
April	649	60	26	157.00
May	623	61	34	213.00
June	586	51	24	128.50
Totals	5,865	503	154	$852.50

These figures indicate that 8.6 per cent of the total number of patients in approved maternity cases in the EMIC program applied for emergency dental services, to be provided by the dentists of their choice, when and if needed. Of those who applied for dental services, 30 per cent (154 cases) actually received such services. This is 2.6 per cent of the total number of maternity cases approved in the nine-month period.

The average cost per patient receiving services is $5.54. Under the program, the following services were given: palliative treatments, 190; extractions, 149; postoperative treatment, 13; x-ray examinations, 51; prophylactic treatment (cases), 56. This is a total of 459 units of service, rendered at a

*Director, Dental Division, Kansas State Board of Health.

†J.A.D.A. 31:1510, November 1, 1944.

cost of $852.50. The average cost per unit of service, including prophylactic cases, was $1.86 (United States Veteran's Bureau Fee Schedule). The average case required three units of service. The fee schedule lists a definite sum for all services except prophylactic treatment. The fee for this service is stated on an hourly basis of $4. Analysis of the cost of prophylactic service for fifty-six cases reveals that 3,945 minutes of treatment was given, with individual cases ranging from thirty to 150 minutes per case. The cost of service for the fifty-six cases was $354. The average number of minutes spent per case was seventy and the average cost for prophylactic treatment was $4.70. The average period of coverage per case was between five and six months.

These figures point out that in about 90 per cent of these maternity cases, patients are willing to assume financial responsibility for securing emergency dental service, and that slightly less than 10 per cent feel the need for receiving financial aid.

The Kansas EMIC Dental Program committee believes that this program is worth while in that it does supply a definite health service to those in need. It is useful in supplying authoritative data on the cost of emergency dental care on the unit of service basis, and it also provides information relative to actual need and demand for free dental service in this population group.

Neuralgia Relieved by Alcohol and Procaine: Report of Case

I. J. Kupfer, D.D.S., Brooklyn, N. Y.

History.—A recluse, aged 91, a retired patrolman who refused to leave his apartment, called for relief from excruciating paroxysmal radiating pain in the vicinity of the left mandibular area. Digital pressure in the lower left mental vestibule and on the inner surface of the ramus caused intensification of pain, which would subside after a period of three minutes and begin again. Questioning showed that the patient had had "an injection near the ear at a hospital almost a year earlier," probably a block of the third division of the trigeminal nerve. His mouth had been examined by the x-rays and he had complete upper and lower vulcanite dentures. These had given him satisfactory service for more than a decade. We shortened the lower denture along the entire left buccal border to relieve pressure on the mental nerve, since the mental foramen in old age approximates the crest of the alveolar ridge. This gave no relief.

Procedure.—All these symptoms indicated a neuralgia of the inferior alveolar nerve. Rather than to attempt a complete block through the foramen ovale, it was decided to take the easier, more superficial route by way of the mandibular foramen, ground which is more familiar to the dentist accustomed to anesthetizing this nerve in everyday practice. Meanwhile, the rubber stopper of a 2-cc. cylinder of procaine was removed, and two-thirds of the contents was suctioned off with a medicine dropper. This was replaced with pure ethyl alcohol. One-quarter grain of morphine sulfate was injected intramuscularly by the attending physician to control paroxysmal spasms. In a quiet interval, 2 cc. of this two-thirds alcohol-one-third procaine solution was injected slowly into the left sulcus mandibularis to block the inferior alveolar nerve. Almost instantaneously, the pain ceased.

Altogether five such treatments were given: May 17, 1938, February 14, 1939, June 14, 1940, November 26, 1942 and March 30, 1944. The last three injections were stepped up with a ratio of three-fourths alcohol to one-fourth procaine. There were no untoward results of any of the treatments. The patient showed a marked over-all improvement, with a new optimistic feeling toward life. During the last injection, it was noted that the tissues were penetrated with difficulty probably because of the fibrous character of the tissues, fixed by previous alcohol infiltrations.

Conclusion.—When all evidence points to a neuralgia of the inferior alveolar nerve, an alcohol-procaine injection into the sulcus mandibularis rather than the foramen ovale is preferable. This should be preceded by one of procaine (plain) to single out the affected branch and verify the diagnosis.

1350 Flatbush Avenue.

NEWS OF DENTISTRY

Official Announcement on Redeployment and Separation of Medical Department Officers

The Office of the Surgeon General, U. S. Army, issued an announcement August 11 on the redeployment and separation of medical department officers. The Dental Division, Office of the Surgeon General, has issued no statement and it is presumed that the announcement is applicable to dental officers. The text follows:

V-E Day found the War Department with approximately 65 per cent of its Medical Corps officers overseas, the largest number in the European and Mediterranean theaters, the others principally in the Pacific. Some time prior to the announcement of V-E Day, the War Department had completed its planning for redeployment, readjustment and discharge. This plan provided for discharges of enlisted personnel in relation to the declining requirements of a one front war, based on length of service, length of overseas service, combat activity, decorations and number of dependents. The composite score was known as the Adjusted Service Rating. The separation of officers was not tied down initially to a specific Adjusted Service Rating although the War Department desired that, within the limits of military necessity, substantially the same type of equitable, objective considerations should govern.

The War Department's pre-V-E Day planning also laid down the principles to govern the movement of personnel out of the European and Mediterranean theaters once victory was achieved. Military necessity, governed by consideration of transportation and the strategic requirements of the Pacific, scheduled the movement of a considerable number of troops directly from Europe to the Pacific. This was particularly true of service troops—the Engineers, Signal and, to a lesser degree, Medical Personnel—which were to prepare the way for the large inflow of divisions which would arrive in the Pacific after a short period of furlough and retraining in the United States.

Within the limits of military necessity, which govern here as in every other phase of redeployment and discharge policy, men with the lowest Adjusted Service Ratings were to go to the Pacific directly. Those with a large number of points were to go to the Pacific via the United States or were to remain in the United States as a strategic reserve until a final decision could be reached concerning the need for them during the remainder of the Japanese war. Men with a still larger number of points would remain in Europe as the Army of Occupation, while those with the highest points would be returned to the United States as surplus. It did not follow that the surplus group would necessarily be discharged, since it was possible—in fact, probable—that some of these men might have lower scores and therefore be less entitled to discharge than others who had returned from overseas at an earlier date or were now in the Pacific awaiting replacement before they could be returned. To permit the discharge of men with low scores because the war in Europe was over and they could be brought home, while men with substantially higher scores would be forced to continue fighting in the Pacific, was clearly inequitable. A responsible policy had to provide for sending replacements to the Pacific to permit the return of their high score personnel for discharge.

While V-E Day found the Medical Department with approximately 35 per cent of its Medical Corps strength in the United States, the same did not hold for other arms and services. All of the divisions were out of the country, and the same was true of the Signal Corps, Engineer and other service personnel. The Medical Department had considerably more of its personnel in the United States because of the fact that the definitive care which the battle wounded received is given them, not in overseas hospitals, but in the large gen-

eral and convalescent hospitals in this country. Likewise there remain many hospitals in the United States which provided medical care for the Service and Air Force troops still in this country as well as for the inductees and trainees. These hospitals had to be manned, and it had not been feasible nor desirable during the relatively short European war to exchange personnel between the United States and Europe. Extreme exigencies in shipping had placed great difficulties on exchange with the Pacific.

In working out the over-all plans for redeployment, it was logical to envisage that most personnel adjustments would be made in Europe, with the divisions cleared for the Pacific on embarkation, permitting the personnel a thirty-day leave in the United States and providing for them a short retraining period to prepare them for the differences in Pacific warfare. There was no room in this plan for adjusting personnel once the divisions returned to the United States, since there was no one left here for exchange purposes, except a few raw recruits.

The Medical Department picture was, however, markedly different. Cognizant of these differences the Surgeon General requested and received permission to exchange personnel in the units coming through the United States to the Pacific on the condition that the units would be able to perform their mission at the time they left this country.

Over-all planning of the Surgeon General went beyond this one step of restaffing units in the United States.

During the spring of 1945, when the European war was reaching its climax and the Pacific war was accelerating, the Surgeon General had stripped the United States of all personnel that could possibly be spared to provide the fighting fronts with the maximum number of medical personnel. However, as the war in Europe began to draw to a close, every effort was made to bring back the battle wounded as rapidly as possible, so as to avoid the errors of World War I, when the wounded were forced to wait for many months because of shipping stringencies. Not only was care taken to avoid a repetition of this, but it was essential that many European and Mediterranean hospitals be cleared quickly so that they could meet the early dates set for direct movement to the Pacific. Early 1945 found the European Theater with more than 191,000 patients; by the end of June this figure was approximately 65,000. May and June saw the return to the United States of 98,000 patients, all but 24,000 of whom came from the European and Mediterranean theaters.

During the first half of 1945, when the maximum numbers of medical personnel were being sent overseas, the number of patients remaining in the general hospital system in the United States, which treats almost exclusively overseas casualties, increased from 133,000 to 240,000.

With personnel flowing out and patients flowing in, the Surgeon General had planned long before V-E Day to request the return of Medical Corps officers as soon as the fighting in Europe ceased. A substantial requisition was placed on the European theaters shortly after V-E Day, but the tremendous personnel shift in the theater and the uncertainty regarding individual scores, which were not available until almost six weeks after V-E Day, made it difficult for the theater to return personnel as rapidly as desired. Such personnel has by this time returned or is en route.

Permission to restaff the units coming through the United States and the early return of personnel to assist in the operation of the hospitals in the United States constitute but two of the four phases of the Surgeon General's plan. Realizing that the units which had to go from the European and Mediterranean theaters directly to the Pacific had to be filled not only in number but also with the proper types of specialists so that they could perform their mission on arrival, and realizing further that the Mediterranean in particular would have to dip down into personnel which had two or more years' overseas service to find specialists to balance these units, the Surgeon General recommended exchanges between the European and Mediterranean theaters to avoid sending high score personnel to the Pacific. After some delays this policy was put into effect, but it will not completely obviate the unfortunate situation in which certain scarce specialists will have to proceed directly to the Pacific without passing through the United States because the exigencies of war permitted no delay in shipping dates.

The final point in the Surgeon General's plan was to prepare the groundwork for an accelerated exchange of personnel with the Pacific, as soon as part of the surplus personnel in the European and Mediterranean theaters was returned to the United States, so

that replacements could be sent from the United States to the Pacific.

To implement the restaffing of units scheduled for the Pacific coming through the United States, a complete census was undertaken of all personnel stationed in the United States.

On the basis of this census and in light of experience to date, criteria were established for withdrawing personnel from units passing through the United States and for assigning personnel now in the United States to the units scheduled for the Pacific.

These are only general rules and are subject to exception in any case due to military necessity, and to change if subsequent developments should make such action necessary. They are not to be understood as creating any right in an officer to continue on duty in this country if military needs now or later should require his assignment to other duty. Subject to these qualifications, the plan for withdrawal of officers from units and for new assignments is shown in the accompanying table.

Plan for Withdrawal and Assignment of Officers

Corps	Age		A. S. R.		Overseas Service	
	Withdrawal	Assignment	Withdrawal	Assignment	V-E Day Withdrawal	Months Assignment
Medical Corps	45 or over	44 or under	75 or over	74 or under	12	0
Dental Corps	40 or over	39 or under	50 or over	49 or under	6	0
Medical Administrative Corps	40 or over	39 or under	50 or over	49 or under	6	0
Sanitary Corps	40 or over	39 or under	50 or over	49 or under	6	0
Veterinary Corps	40 or over	39 or under	50 or over	49 or under	6	0
Army Nurse Corps	40 or over	39 or under	30 or over	29 or under	6	0
Physical Therapist Corps	40 or over	39 or under	30 or over	29 or under	6	0
Medical Department Dietitians	40 or over	39 or under	30 or over	29 or under	6	0

The fact that more stringent criteria for withdrawal and assignment were established for Medical Corps officers than for other Medical Department Corps reflected smaller availabilities of Medical Corps officers than of other Medical Department Corps.

Because there is nothing in this plan of medical redeployment which takes precedence over considerations of military necessity, it will not be possible to apply the withdrawal principle to Commanding Officers and Executive Officers of hospital units or to certain Medical Department personnel attached to divisions because adequate replacements cannot be found and trained within the available time.

Moreover, there is nothing in the plan which stands in the way of volunteering. If an individual desires service in the Pacific, he can go if he passes the physical qualifications, irrespective of age, score or prior overseas experience.

Despite the above qualifications, it is hoped that the criteria outlined in the accompanying table can be followed in the case of the vast majority of Medical Department officers returning through the United States for redeployment to the Pacific.

Intimately associated with the problem of redeployment are problems of readjustment and discharge. Reference has already been made to the fact that the original plan of the Surgeon General contemplated the sending of replacements to the Pacific at the earliest possible date, in order to permit the return to the United States of personnel who have had long overseas service. One phase of this plan is already in operation. Large numbers of nurses who have been in the tropics for two or more years will soon have the opportunity of returning to the United States while the theater will have the benefit of a group that has not yet suffered from the exhaustions incident to life in the tropics and to combat.

At first glance, it might appear difficult to understand how it happens that several months after V-E Day, with the scale of combat having shrunk from a two to a one front war, the Army has only now begun to separate Medical Corp officers and other Medical Department personnel. The 98,000 patients who were brought back to the United States in May and in June were preceded in March

and April by 89,000 patients, or a total of 187,000 patients during a four month period. On the basis of detailed experience tables for World War II, the average overseas casualty returned to the United States for definitive treatment remains in a hospital in this country for five to six months. This means that, although there have been only Pacific casualties since V-E Day, there were a sufficient number of casualties prior to V-E Day to keep the general and convalescent hospitals in this country operating at or near peak until late fall of this year. The Medical Department personnel that are attached to divisions in Europe and in the Mediterranean have, of course, not been busy with the care of casualties since V-E Day, although a considerable number were forced to assume the job of caring for the thousands of sick and wounded displaced persons in the areas overrun by the American armies. However, this "divisional" personnel has for the most part been busy dismantling forward hospitals and moving to the staging areas for embarkation either directly to the Pacific or through the United States. In addition, there are many thousands of Medical Department officers at the present moment on the high seas and many other thousands on leave in the United States preparatory to taking up assignments in this country, so that others who have not yet been overseas can go.

When hostilities ceased in Europe, the worldwide medical picture was this: an expanded war in the Pacific with vastly increased requirements, not only to cope with the engagements that were to be launched, but to facilitate the return to the United States of large numbers of personnel who have had long service in the Pacific for reassignment or separation. The United States had a peak patient load and would soon have thrust upon it a substantially increased medical processing load incident to the return of troops for redeployment to the Pacific or for discharge. This meant that the surplus brought about by a shrinkage from a two to a one front war was largely in Europe, where it could not be used for any of the strategic purposes for which it was needed: that is, to permit the separation of high score personnel, which could only take place after such personnel had been returned to the United States, to take up assignments in the United States and help carry the peak load or to serve as replacements for individuals to be sent to the Pacific so that the latter could return its high score personnel to the United States for separation.

The keynote to the separation policy was therefore to give consideration to the participation of all theaters and to be certain that the surplus theaters—European and Mediterranean—would return their personnel at the earliest possible moment. At the end of World War I, with the war terminating for all at the same time, demobilization could be haphazard and yet substantially equitable: Off the gang plank and out. Such a procedure after V-E Day would have been unthinkable. There was a complication over and beyond the necessity of including the Pacific and providing for its participation in any separation plan. As was true of redeployment, military necessity had to govern and take precedence over any individual's score. The keynote to the efficient medical service in this war has been the careful marshaling of the limited number of key specialists who, despite every effort that has been made to utilize their skill to the full, have proved insufficient in number.

The separation plan of the Surgeon General had to deal, therefore, not only with numbers but also with classes of personnel. On the basis of detailed studies, it was decided that it would be best to establish two classes—one for scarce specialists, the other for non-scarce specialists and general duty officers—and to set a definite score for each, so as to keep under strict control the outflow of scarce specialists. Consideration was given at one stage of the planning to prohibit the release of any officers in the scarce class, but it was believed better to plan where possible to release very high score individuals as well as those over 50 years of age, irrespective of specialty, so long as the number of such releases would not endanger the efficiency of the medical service. The list of scarce specialists was kept to a minimum, after a review of worldwide requirements and availabilities.

Although readjustment regulations place responsibility on the Chief of each Technical Service for the establishment of separation policies, the Surgeon General felt it incumbent on him to establish a representative Separations Board and to charge this board with developing a series of objective criteria which would insure the continuation of high medical standards during the Pacific war and, at the

same time, provide an equitable basis for the separation of surplus officers. The Deputy Surgeon General was designated Chairman of the Separations Board, and representatives of the three major forces—Army Air Forces, Army Ground Forces and Army Service Forces—were made members of the Board.

Establishment of Separations Board

The Board thoroughly explored all aspects of the separation policy and had at its disposal comprehensive statistical material before deciding the criteria for separation.

The Board decided to establish definite criteria for separation, subject, as above stated, to the limits of military necessity which governs all discharge policy. These criteria, therefore, create no vested right in any officer to discharge, but constitute the goal to be sought, and the general rules to be applied in the absence of supervening military necessity. Such necessity may exist as to the time when, in any individual case, this step can be taken. Also it may arise from the possible need for a relatively few officers with irreplaceable experience whose usefulness is so great as to transcend individual consideration. Separations will be considered by the Surgeon General's Office and granted within the above principles wherever possible. The criteria hereafter set forth and all provisions of the present statement of separation policy must be read and understood as subject to the above qualifications.

Criteria for Separation from the Service

1. Medical Corps officers returned by a theater or declared surplus by a major force (except those with primary military occupational specialties listed in paragraph below) are eligible for release from active duty if their Adjusted Service Rating is 100 or above.

2. Medical Corps officers in certain scarce military occupational specialties are eligible for release from active military duty if they have an Adjusted Service Rating of 120 or more:

Gastroenterology	*Neuropsychiatry*
Ophthalmology and Otolaryngology	*Neurosurgery*
	Thoracic Surgery
Cardiology	*Plastic Surgery*
Dermatology	*Orthopedic Surgery*
Allergies	*Clinical Laboratory*
Anesthesia	

3. Medical Corps officers over 50 years of age, irrespective of their specialty classification, are eligible for relief from active military duty if they are returned to the United States by a theater or declared surplus by a major force.

4. No Medical Corps officer with an efficiency index of 41 or more who desires to remain on active military duty will be relieved, irrespective of age, military occupational specialty or Adjusted Service Rating.

Paragraph four is in keeping with the spirit of readjustment regulations which provide that individuals who desire to remain on active duty will be given every consideration.

Because of the fact that the general hospitals in the United States are now at peak and because the Surgeon General desires to send replacements to the Pacific as quickly as possible, the age provision is not being put into effect at the moment for personnel in the Army Service Forces, and *no Medical Corps officers in the nonscarce category is being released who has less than 110 points (except those who returned from overseas since V-E Day).* However, it is hoped that when more of the surplus personnel is returned from the European and the Mediterranean theaters, this temporary expedient can be lifted.

Subject to the general qualifications stated, the accompanying table summarizes the criteria for separation established for all Medical Department Corps.

As in the case of Medical Corps officers, the Army Service Forces, for the time being, have not placed in effect the age provision for Dental Corps officers, and they are operating

Criteria for Separation

Corps	*Age*	*A. S. R.*
Medical Corps*	50 or over	100 or over
Dental Corps	50 or over	100 or over
Medical Administrative Corps	45 or over	90 or over
Sanitary Corps	45 or over	90 or over
Veterinary Corps	50 or over	110 or over
Army Nurse Corps†	40 or over	65 or over
Physical Therapists Corps†	50 or over	65 or over
Medical Dietitians Corps†	50 or over	65 or over

*Scarce categories, A. S. R. 120.

†The following additional provisions cover separations: dependent children under 14; married to demobilized allied personnel.

under a score of 110. But it is hoped that this exception can be removed later.

The foregoing criteria outlined have been established for an initial period of several months, and the point score will be reduced when the number of surplus personnel returned from the European and the Mediterranean theaters makes this possible.

During recent weeks, every effort has been made to speed the return of surplus personnel from the European and Mediterranean theaters so that a maximum number of Medical Department officers, especially Medical Corps officers, can be returned to the United States for reassignment and separation.

Although the original plans provided that the last of the surplus personnel would not be returned until the middle of 1946, it now appears probable that the entire surplus will be in this country shortly after the end of 1945. The major factors influencing the return of personnel from the Mediterranean and European theaters are the rate at which troops leave those theaters and the availability of shipping for the return of Medical Department personnel. So long as large numbers of troops remain, a part of the surplus personnel must remain to furnish them medical care.

The rates at which Medical Corps and other Medical Department officers are separated are conditioned largely by the Pacific. If the Pacific did not exist, or if it could be ignored, as it clearly cannot, separations could be accelerated by approximately five months or more. When a surplus officer with a high score returns from Europe, he could be discharged. But if there are individuals with higher scores in the Pacific, a different procedure is indicated. The officer returning from the European theater, instead of being separated upon arrival, is granted a thirty-day leave, plus an allowance for travel time from the port to home and from home to his new station. The individual who has not yet been overseas is granted a preembarkation leave of approximately fifteen days, which, when added to his travel time to the port and the period preparatory to sailing, amounts to approximately one month. Here we have two months. The trip overseas requires just under a month, or a total of three months. Travel time from the port to the new station in the Pacific, overlap on the job and travel time to the port of the officer returning to the United States eat up another month, or a total of four months. The trip home requires another month, or a total of five months. This is the minimum if the officer is separated on arrival. But if his points should be below those of an officer currently assigned in the United States, the process continues. The officer returning from the Pacific will receive a month's leave, additional travel time to and from his home, and only after he has been at his new station for approximately two weeks will the high score individual be released for separation. Here we had a total of seven months. Equity in separations means delay in separations of between five and seven months. Here is the explanation for the apparent paradox of how it happens that, two months after V-E Day, surplus medical personnel is just beginning to be released from the Army and why it will take many months before all of the surplus is finally separated. However, it is the Surgeon General's firm belief that the American public and the entire medical profession feel that the War Department's basic program of readjustment which includes the Pacific is sound and just.

Within the limitations of logistical requirements, especially transportation, the plan contemplates that the Army will point toward a reduction in the strength of the Medical Corps by approximately 7,000 by May of 1946. Because of the need to absorb the leave and travel time of replacements to the Pacific, not more than 4,000 of this number can be separated by the end of this year.

The transfer of several hundred thousand medical personnel in the midst of war, under great urgencies, involving three continents, represents the single largest undertaking of its kind in the history of the world and is dwarfed only by the still greater transfer involved in moving all Army personnel. To cope with this situation of unparalleled magnitude, the Surgeon General has evolved, after the most careful consideration, a detailed plan which he believes will secure the end desired by all—the finest medical service for the American soldier and the highest degree of equity for the officers and men of the Medical Department who are provided this service.

Bill Authorizes Increased Funds for Maternal and Child Health

Sen. Claude Pepper, Florida, for himself and nine other members of the Sen-

ate Committee on Education and Labor, has introduced S. 1318 to provide for the general welfare by enabling the several states to make more adequate provision for the health and welfare of mothers and children and for services to crippled children. This bill would authorize an appropriation of $100,000,000 for the fiscal year ending June 30, 1946: $50,000,000 for maternal and child health services, $25,000,000 for services for crippled children, $20,000,000 for child welfare services and $5,000,000 for administrative expenses incurred by the Children's Bureau in carrying out the provisions of the bill. Thereafter, such sums will be made available as the Congress may decide.

Kellogg Foundation Plans to Aid Postgraduate Education

The W. K. Kellogg Foundation is making plans to assist a selected number of dental, medical and nursing schools in developing comprehensive programs of refresher and postgraduate education for returning veterans. The Foundation will aid this program by direct grants to the schools for a period of three to five years. The text of a statement by Philip E. Blackerby, Dental Director of the Foundation, follows:

During the war, the W. K. Kellogg Foundation has devoted its efforts and its resources almost entirely to projects having a direct bearing on the war effort. Financial assistance, in the form of loan and scholarship funds, was granted early in the war to schools of medicine, dentistry, and nursing, to help maintain the flow of professional personnel to the armed forces.

As problems associated with reconversion to a peacetime economy begin to arise, the foundation expects to direct a proportionate part of its endeavors to assisting in their solution. One of the most important of these problems, in the field of health, is the reorientation and adjustment of medical, dental, and nursing veterans returning from the service. Financial provision for refresher, postgraduate, and graduate education for these veterans has been made through the G.I. Bill of Rights, but the facilities and personnel of the institutions which will be called upon to provide such educational programs will be severely strained if a substantial number of veterans take advantage of these educational privileges and opportunities.

Accordingly, the W. K. Kellogg Foundation has formulated plans for assisting a selected number of medical, dental, and nursing schools in the development of comprehensive programs of refresher and postgraduate education for returning veterans, looking forward at the same time to the expansion of such programs on a long-range basis, to assure opportunities for continuing education for the practicing professions as a whole.

The assistance which the foundation expects to provide for this purpose will be in the form of outright grants to the schools, covering a period of three to five years.

Ohio State University to Receive Funds for New Dental Building

A bill providing an appropriation of $800,000 for a new dental building at the Ohio State University, Columbus, has recently been signed by Governor Frank J. Lausche of Ohio. The bill also provides a $4,200,000 appropriation for a new hospital. The dental building will be erected adjacent to the present building, which houses both dentistry and medicine. The new plant will give the College of Dentistry ample space for the development of its recently inaugurated courses in dental hygiene and for its graduate and postgraduate program, and will also include accommodations for a joint medical-dental library.

Course in Endodontia Offered by Pennsylvania

A postgraduate course in endodontia (root canal therapy) will be given by The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania, September 5 to November 14. The course, which is offered to a limited number of dentists who wish to acquaint themselves with re-

cent advances in the field, will be given every Wednesday during the period specified. The fee for the course is $150.00. For further information, address the Dean, School of Dentistry, University of Pennsylvania, 4001 Spruce Street, Philadelphia 4.

"G. I. Bill" Revised to Provide More Benefits

A revision of the "G. I. Bill of Rights," which will provide enlarged benefits for the returning veteran, has been passed by the House of Representatives. The bill, introduced July 10 by John E. Rankin, (Mississippi), chairman of the World War Veterans' Legislation Committee, was passed July 18. It now goes to the Senate, where it has a good chance for passage when the upper house reconvenes in October. The bill is in the form of amendments to the "G. I. Bill of Rights," technically known as the Servicemen's Readjustment Act of 1944.

In addition to liberalizing the loan provisions of the existing law, the pending bill would effect certain changes in the provisions relating to the education of veterans. Under the new bill, courses may be initiated four years after the date of discharge or the termination of the war, but no course shall extend more than nine years after the termination of the war. Correspondence courses will be permitted if the bill passes and the subsistence allowance of a veteran undergoing training will be increased from $50 to $60 per month if the veteran is without dependents, and from $75 to $85 a month if the veteran has dependents.

Under the present act, an annual tuition fee of not more than $500 is offered with the provision that the tuition for a short course shall be a pro rata portion of the $500 based on the length of time of the course. This provision permitted only very small payments for short courses of a week's duration, no matter what tuition fee was charged. Under the new bill, the full tuition for a refresher or retraining course may be paid provided only that the total amount does not exceed $500.

The time limit within which the veteran may apply for a loan will be increased from two to six years after separation from the armed forces or the termination of the war. The bill further provides that when such a loan is made, the lender is automatically guaranteed 50 per cent of the loan by the Administrator of Veterans Affairs. The act itself would constitute the guaranty.

Three Bills Propose Federal Aid to Promote Research Work

Three bills which would authorize federal aid to research work have been introduced into the Senate. S. 1297, introduced by Edwin C. Johnson, (Colorado), Harley M. Kilgore (West Virginia) and Claude Pepper (Florida) would create a national science foundation to promote scientific research as an independent agency of the federal government. J. William Fulbright (Arkansas) has introduced S. 1248, which would create a bureau of scientific research in the Department of Commerce. S. 825, introduced by Harry F. Byrd (Virginia), proposes the establishment of a research board for national security. This bill was reported favorably to the Senate July 28.

List of Postwar Educational Opportunities Offered by Council

A list of the graduate, postgraduate and refresher courses planned by the dental schools of the country to meet the needs of dentists returning from the armed forces has been prepared by the Council on Dental Education of the American Dental Association. The latest data available on types of course, registration, cost and other essential information are included. Lists will be supplied on application to the Council on Dental Education, American Dental Association, 222 E. Superior St., Chicago, Ill.

BOOK REVIEWS

American Medical Practice in the Perspectives of a Century. By Bernhard J. Stern, Ph.D., Lecturer in Sociology, Columbia University and Visiting Professor of Sociology, Yale University. 144 pages. Price $1.50. New York: The Commonwealth Fund.

The Committee on Medicine and the Changing Order of the New York Academy of Medicine was given the task of reviewing the nature, quality and direction of economic and social changes. The purpose of this work was to determine how the best elements in the science and art of medicine may be preserved, embodied and extended in whatever new social patterns may ultimately appear. This book is one of a series of monographs by the members of the committee resulting from the investigations and studies.

The author places considerable emphasis on the results of surveys which show that the amount of medical care American people receive is directly related to income, type of community, geographic region and race. Statistics are presented which show that although mortality and morbidity rates are highest among low income groups, the amount of medical care received by this segment of the population is less than by persons in higher income brackets; that the prevalence of disease in rural regions is nearly as great as in urban areas, yet farm families receive considerably less medical care, and that Negroes receive much less medical care in both quality and quantity, than do white people.

Improvements in medical practice have contributed to our awareness of social problems. According to the author, "The focus of medical practice has shifted from the disease to the patient. Moreover, because of the trend to supplement the curative aspects of medical care by the preventive, interest has developed in the social relations of the patient. Today the physician is increasingly associated with the forces in society which recognize the close interrelation between individual welfare and social welfare, and which seek to create a social environment conducive to the development of the fullest physical and psychological potentialities of the population. In this respect, medical science has become a social science."

The book provides a great deal of information and an excellent list of references on the supply and distribution of physicians, on patient load, on income of physicians and on the distribution of medical services.

The author obviously intended to emphasize the problem of medical care by a factual presentation of available data and without resorting to emotionalism. As stated in the preface, "What is wanted is not a romantic history of medicine, but rather an historical exposition of the reciprocal interplay between the social, technological and economic forces and medicine." This was accomplished in commendable fashion and the result is a valuable contribution to the study of medicine in public health.

No attempt is made to present a plan for solving the medical care problem. The need for constructive action, as well as the manner by which it can be achieved, is summarized as follows: "Medical progress, which has lowered illness rate and improved the health of the population, has undoubtedly contributed to the increasing productive capacity of the American people as they participate in a machine society. By the conquest of communicable diseases medicine has made industrial life more stable, for it has decreased considerably the disruptions in social life brought about by disastrous epidemics.

"It is this very substantial achievement of medicine that has engendered many of its present problems. Modern medicine has proven its scientific efficacy to such a degree that when any segment of the population is deprived of its benefits, it recognizes that it is seriously at a disadvantage. The problems of medical practice that are agitating the public today are therefore primarily concerned with the provision of a high quality of curative and preventive medical service to all the people, whether they belong to low or high income groups, whether they

be rural or urban residents, Negro or white. The future prestige of the profession and its further contribution to scientific and social progress are closely related to the solution of these problems.

"The full satisfaction of the health needs of the American people cannot, of course, be achieved by the medical profession alone. Public health services are also essential for the protection of the community. Above all, to be healthy, people require the opportunity to work usefully, and creatively during their productive years, under good working conditions, to receive incomes sufficient to provide the necessities of life, which include adequate and nutritious foods, necessary clothing, wholesome housing, effective education, and satisfying leisure and recreation. Adequate medical care is, therefore, but a segment of a larger program for health. It is, none the less, a basic and important part of such a program, and whatever advances are made in medical care will contribute substantially to the well-being of the American people."—*Allen O. Gruebbel.*

A Textbook of Oral Pathology. By Thomas J. Hill, D.D.S., Professor of Clinical Oral Pathology and Therapeutics, Western Reserve University, Cleveland. Ed. 3, revised. 407 pages, 332 illustrations. Price $6.50. Philadelphia: Lea & Febiger, 1945.

Generally speaking, there are only a few pages in this book which are fully acceptable. The material is not well arranged, many of the illustrations seem inconsequential and the bibliography is casual and contains a number of erroneous statements.

The legend for Figure 20 reads "front view of skull shown in Figure 19," although the two illustrations show two different skulls. In Figure 21, "Decalcification of the deciduous teeth" is not decalcification, but resorption. Figure 220, according to its legend, illustrates healing of a tooth socket. In reality, it shows the median intermaxillary suture.

One of the most notable misconceptions is evident in Figure 221, a diagram showing the relation of the teeth to the supporting tissues and, in a detailed sketch, that of the epithelial attachment (E.A.) to the tooth. The attachment is, in this sketch, shown at the cemento-enamel junction as a linear attachment only, as it was held to be until 1921, when Gottlieb first described the epithelial attachment to the tooth. Such misconceptions of the epithelial attachment were encountered for some time after Gottlieb's publication, but not for long. His discovery of the real nature of the epithelial attachment to the tooth has been generally accepted. Knowledge of the relation of gingiva and tooth is indispensable for the proper understanding of the pathology of periodontal disturbances, a fact realized by Hill—hence the "Introduction to Periodontology" and diagrammatic explanation. However, the diagram is misleading and defeats this purpose.

The chapter on periodontal pathology is somewhat confusing. The nomenclature of the Academy of Periodontology is, on the whole, followed in the book (as well as the classification of the reviewer), but not systematically, resulting in confusion, although the macroscopic as well as microscopic illustrations in this chapter are excellent. "Gingivitis" is distinguished from "periodontoclasia," the latter term defined as indicating, nonspecifically and collectively, all destructive and degenerative diseases of the periodontium. In this way, gingivitis would be a part of "periodontoclasia." The author seems to include only periodontitis and periodontosis in this group (chapter XV), although later he refers to periodontosis as a separate unit (p. 326). It is difficult for the reader to form a clear conception of this phase of pathology.

The reviewer agrees with Hill that the progress of knowledge of periodontoclasia is fascinating; but, in the bibliography on this chapter, only five out of forty-five references refer to publications written since 1930. The bibliography in general is haphazardly compiled and not up to date. Ninety per cent of the references are of merely historic value. The initials of G. V. Black ("G. B." Black, p. 238) might have been verified from the former edition.

The first chapter gives a short, but good outline of the development of face and oral cavity as a basis for the understanding of the common anomalies of this region. Although the chapter on caries stresses the clinical features and physiology rather than the pathology, it gives a well-rounded picture of the subject.

The chapter on stomatitis lacks system. Diseases of different origin are grouped together, whereas those belonging together are separated. Actinomycosis is followed by dilantin gingivitis; syphilis, by anemia and leukemia; pemphigus, by agranulocytosis. Some important diseases of the oral mucous membrane are not mentioned at all. In describing the diseases of the enamel, the author did not take into account the knowledge gained in the last ten years. Disturbances in calcification and formation of enamel are classified as hypoplasia. Hutchinson's tooth is also thus classified. This point of view is outdated. The term "degeneration" is frequently used in a misleading way. The dental pulp is said to consist of embryonic connective tissue—a long-discarded conception.

The foregoing are points that can be made in a short review. There are many more discrepancies to be corrected. It seems regrettable that, in a new edition, so little attention has been paid to recent developments in research. Large sums of money are spent for this purpose and more is needed. Great sacrifices are made for the advancement of our knowledge. If these advances do not find their way into new editions of textbooks, the dental profession will gain little from them.—*Balint Orban.*

Public Relations of the Medical Profession, State of Michigan, Michigan Health Council, Detroit, Michigan, 1944. 15 pages (Processed).

In 1944, the Michigan Health Council, composed of the Michigan State Medical Society, Michigan Medical Service, Michigan Hospital Association and the Michigan Hospital Service, sponsored a survey of a representative sample of the public "to determine the public's attitude toward the medical profession, and to estimate the degree to which the idea of socialized medicine has been accepted by the people of the state of Michigan." A trained group of interviewers from a commercial polling organization talked with 4,968 persons in all parts of the state. A series of detailed questions were asked of each person.

The responses revealed that the public attitude was strongly favorable to physicians and health agencies in its general relationships, opinion of fees and other aspects of practice. Eighty-one per cent of the group indicated that they would advise their children to enter the medical profession if the children were qualified and interested; 91 per cent believed doctors were doing a good job for the public; 56 per cent preferred to have their regular doctors perform ordinary operations; 60 per cent believed doctors are as honest as they should be, while 28 per cent thought not—almost half of the latter because doctors "don't tell the truth," and 69 per cent believed they paid the right amount for doctors' services, while 20 per cent thought they paid too much.

More than 41 per cent of the individuals reported that one or more members of their families subscribed to a medical or hospital service plan, and 49 per cent of the highest income group reported such coverage, while only 28 per cent of the lowest socio-economic group had such coverage. The largest number of those interviewed believed that they were paying about the proper amount for hospital care, although the percentage was lower than for the same question concerning doctors' fees. About 46 per cent believed that they were paying the right amount and 27 per cent that they were paying too much, while 26 per cent did not know. The respondents generally were favorable to an increase in prepayment premiums to cover the cost of medical service at a hospital in addition to the premium covering surgical and hospital costs. About a half of the single persons and a third of the married persons were willing to double the established medical-hospital plan premium in order to receive complete medical and surgical care in the home, doctor's office or hospital. This would entail the monthly payment of $8 for a family group.

When asked their opinion of the establishment of "a government operated medical-hospital plan," 39 per cent were in favor and 43 per cent were not in favor, while 18 per cent were uncertain. In this instance, polling experts have pointed out that the question might have been considered "loaded," since national surveys made by other groups, using differently phrased questions, have found in each instance that a majority of the public were in favor of compulsory health insurance.

The largest number of persons in the two lower income groups were in favor of a

government program; while a majority of the two higher income groups expressed themselves as not in favor. On additional analysis, it appeared that almost half of all persons aged 16 to 34 were in favor of a government program, while almost half of the older group were not favorable to it. About 18 per cent of each age group did not express a definite opinion.

The largest number, almost 34 per cent, indicated that they would prefer a voluntary, professionally sponsored plan; present private practice was selected by 27 per cent; 15 per cent named a government-controlled plan as first choice, and 13 per cent preferred regular insurance.

While the survey was concerned mainly with the medical profession and hospitals, several questions referred to the public's attitude toward dentists and the organization of dental care. Seventy per cent of those interviewed indicated that they would advise young men to go into the dental profession; 17 per cent would not be willing to give such advice, while 13 per cent were uncertain. When asked if they would like to have a monthly prepayment plan for dental service, 29 per cent said yes and 61 per cent no. A similar question concerning the development of a prepayment plan for nursing service revealed 18 per cent in favor, 70 per cent not in favor.

Consumer and public opinion polling has been a significant development in this country during the past ten years. During 1944, two state medical societies conducted such surveys to ascertain the temper of the public which they serve. Poll-taking might be considered as a new instrument evolving out of our democratic philosophy, and accepted by modern society because of the tremendous growth of community and national populations. Where the local cracker-barrel and the public forum or town meeting can no longer serve, it appears that the sample survey may prove an acceptable substitute.

It has long been standard practice among manufacturers of consumer products, service enterprises, and magazine publishers to take such measurements of the appeal of products, effectiveness of advertising, good will and desires of consumers for new products or changes in old ones. In a period of rapid social change, when developments begin to impinge upon the health professions, it is encouraging to note the acceptance and use of the new instruments by an allied profession.—*Joseph E. Bagdonas.*

Fundamentals of Pharmacology. By Clinton T. Thienes, M.D., Ph.D., Professor of Pharmacology, University of Southern California. Attending Pathologist (Toxicology), Los Angeles County Hospital. 550 pages; illustrated. Price $5.75. New York: Paul B. Hoeber, Inc., 1945.

This textbook is designed to present the basic principles of pharmacology within the time ordinarily allowed to this subject. The attainment of such an objective requires a judicious selection of subject matter. In view of the varied opinions as to the proper content of pharmacology courses, this text will probably have a mixed reception. In the reviewer's opinion, the objective of this book has been only partially attained.

An extremely brief explanation of the U. S. Pharmacopoeia and the National Formulary was found only in the last chapter of the book. Some teachers would welcome an earlier and somewhat amplified discussion of these official volumes and of such unofficial, but authoritative works as New and Nonofficial Remedies and Accepted Dental Remedies. The objective of brevity might have been served better by omitting the separate sections which list preparations and dosage forms. For this purpose, many teachers use a small handbook as a companion textbook.

Many literature references have been included in the body of the text, but their value is limited by lack of journal citations and by the fact that none more recent than 1943 is listed. It is not clear, in fact, why such a high degree of documentation is necessary in a brief textbook. The bibliographies should be sufficient to indicate the most desirable supplementary reading.

The author's extensive experience in

the field of pharmacology should qualify him to write with authority regarding the actions of the drugs considered. Criticisms of this textual material will probably be few, of a minor nature and concerned generally with related fields. The chemist might question the statement that, in structure, nikethamide is closely related to nicotine (page 20). Some physiologists will question the implication that alternation of function (patency) of the glomeruli is a significant factor in the physiology of the human kidney (page 206).—*J. Roy Doty.*

Books Received

Full Denture Technique. By W. J. Tuckfield, M.D.Sc., Sc.D., F.A.C.D. Senior Lecturer in Charge of the Department of Prothesis, Dental School, University of Melbourne. Sometime Acting Professor and Dean of the Faculty of Dental Science, University of Melbourne. 237 pages, with 166 illustrations. Appendix. Index. Cloth. Melbourne: Ramsay, Ware Publishing Pty. Ltd., 1944.

Public Medical Care. By Franz Goldmann, M.D. 226 pages. Index. Cloth. Price $2.75. New York: Columbia University Press, 1945.

Operative Dentistry. By W. Clyde David, A.M., M.D., D.D.S., Former Professor of Operative and Clinical Dentistry and Dean of the Faculty, at this time Lecturer in the Section on Operative Dentistry, University of Nebraska, College of Dentistry, Lincoln, Nebr. Fifth Edition. 432 pages, with 419 illustrations. Index. Cloth. Price, $7.50. St. Louis: C. V. Mosby Company, 1945.

Dental Chronology. By Hermann Prinz, A.M., D.D.S., M.D., Sc.D., Dr. Med. Dent., Emeritus Professor of Pharmacology and Lecturer, Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania. 189 pages, with ninety-seven illustrations. Index. Cloth. Price $3. Philadelphia: Lea & Febiger, 1945.

Rypins' Medical Licensure Examinations. Revised under the editorial direction of Walter L. Bierring, M.D., F.A.C.P., M.R.C.P., Edin. (Hon.), member of National Board of Medical Examiners; Secretary, Federation of State Medical Boards of United States. Fifth Edition. 546 pages. Index. Cloth. Price $6. Philadelphia, London and Montreal: J. B. Lippincott Company, 1945.

Pharmacology and Dental Therapeutics. By Hermann Prinz, A.M., D.D.S., Sc.D., Dr. Med. Dent., Professor Emeritus of Materia Medica and Therapeutics, School of Dentistry, University of Pennsylvania, and U. Garfield Rickert, A.M., D.D.S., Late Professor of Diagnosis, Dental Therapeutics, and Radiology, School of Dentistry, University of Michigan. Ninth Edition; rewritten and revised by Edward C. Dobbs, D.D.S., Associate Professor of Pharmacology, Dental School, University of Maryland; Member of the Council on Dental Therapeutics, American Dental Association. 567 pages. Index. Cloth. Price $6.50. St. Louis: C. V. Mosby Company, 1945.

English-Spanish, Spanish-English Dental Vocabulary. By Joseph S. F. Marie. 159 pages. Cloth. Price $4. Lancaster: Jacques Cattell Press, 1943.

Anatomy as a Basis for Medical and Dental Practice. By Donald Mainland, M.B., D.Sc., F.R.S.C. Professor of Anatomy, Dalhousie University, Halifax, N. S., Canada. 863 pages, with sixty-one illustrations and twelve tables. Appendices. References. Index. Cloth. Price $7.50. New York: Paul B. Hoeber, Inc.; Medical Book Department of Harper & Brothers, 1945.

CURRENT LITERATURE

A Reading from the "De Humani Corporis Fabrica" of Andrea's Vesalius. J. B. de C. M. Saunders and C. D. O'Malley. J. Am. Coll. Dentists 11:211, June 1944.

The chapter on the teeth from this work of Vesalius is by no means the most brilliant example of his writing either in originality or in display of his great powers of observation. In it are discussed the form and probable function of the different morphologic types of teeth. The number of teeth and their innervation and the process of shedding of teeth are described. Vesalius failed to recognize a primary and secondary dentition and believed that teeth exhibited growth at any time in life. He was the first to describe the pulp cavity, a structure not recognized by Galen.—*J. E. Gilda.*

Results of Penicillin Therapy—A Report for the Joint Services Penicillin Committee. R. F. Farquharson, P. H. Greey and S. R. Townsend. Canad. M. A. J. 53:1, July 1945.

This report presents a summary by the committee of the results of penicillin therapy obtained over a period of one year. Included within the summary are sections of dental interest. Two patients with Ludwig's angina and three with cellulitis of the neck recovered rapidly under penicillin treatment. One patient with severe fusospirochetal gingivitis, previously treated by local methods for twelve weeks, was given 100,000 units of penicillin intramuscularly in six divided doses at three-hour intervals. There was immediate improvement followed by a negative smear for fusospirochetal organisms in twenty-four hours. Similar results from a total dosage of 100,000 to 300,000 units were obtained in patients suffering from fusospirochetal pharyngitis. The use of penicillin pastilles has now become the method of choice in treatment of Vincent's infection.—*J. E. Gilda.*

Dental Caries in Wild Bears. E. R. Hall. Tr. Kansas Acad. Sc. 48:79, June 1945.

Three hundred and eighty-four specimens of American wild-taken bears (195 subgenus Euarctos, black bears, and 165 subgenus Ursus, grizzly and big brown bears) were examined for dental caries. Six Euarctos and three Ursus, or nine bears in all (1 per cent) had dental caries. Caries occurred in both sexes and in subadult and adult animals. A previous study of 3,401 other specimens of wild-taken American carnivores and 2,256 insectivores failed to show any carious lesions. Bears have molars with low rounded crowns which resemble the tooth surfaces of human molars more closely than any other carnivora. It is suggested that bears of subgenera Ursus and Euarctos are more frequently afflicted with dental caries because these animals normally eat much food rich in sugar. The other carnivora eat the same general classes of foods, sweets excepted. Four plates present excellent photographic evidence of the pathologic lesion.—*J. E. Gilda.*

Calcium and Phosphorus Metabolism in Osteomalacia. Availability of Inorganic, Phytic and Dietary Phosphorus and the Effect of Vitamin D. K. Wang et al. Chinese M. J. 62:1, January-March 1944.

Two cases of osteomalacia were studied to ascertain the availability of phytin phosphorus supplied either from cereals or from phytin preparations, in comparison with inorganic phosphate, under constant calcium and constant total phosphorus intake. The effect of vitamin D on the mineral metabolism was also studied. In each patient, four cycles of observations, each consisting of nine four-day metabolic periods, were made. The nine four-day periods were divided into three parts during which three different forms of phosphorus were supplied in succession, these being phytin phosphorus periods (P), dur-

ing which a low phosphorus diet was given together with added phytin; inorganic phosphate period (I), in which the same diet was served and disodium phosphate solution was added, and dietary phosphorus periods (D), in which the phosphorus intake came entirely from the diet, which was high in cereals. The daily intake of total phosphorus in all periods was nearly the same. The daily intake of calcium was also maintained at a constant level. After the completion of two cycles, vitamin D was given daily. Determinations of phytin phosphorus in food and stool were made according to the method of McCance and Widdowson, with a few modifications.

The results indicated that when 30-40 per cent of the phosphorus intake was in the form of phytin, the absorption and retention of both calcium and phosphorus were decreased, when compared with those on a similar level of inorganic phosphorus intake. The impaired utilization of phytin was said to be due to its limited hydrolysis and to the incomplete absorption of hydrolysed phytin. It was found that vitamin D, while unequivocally capable of promoting the absorption and retention of calcium and total phosphorus, did not show clear-cut enhancing effects on the utilization of phytin. The authors considered a high cereal or phytin-containing diet to be an important contributing factor in the pathogenesis of osteomalacia.—*S. Wah Leung.*

Penicillin Creams. Philip Greey and H. D. Hebb. Canad. M. A. J. 52:550, June 1945.

The stability of penicillin when incorporated into various creamy bases at a concentration of about 200 units per gram and stored at 8, 24 and 37 C. was studied. Prescriptions for nine such bases tested are presented. The data showed that penicillin in three of the preparations was rapidly destroyed at 37 C. and destroyed at a somewhat lower rate at 24 and 8 C. None of the preparations tested remained stable for any great length of time, although five of them maintained their potency quite well for two or three weeks when stored at refrigerator temperature. From these results, the authors considered that none of the formulae tested provided a base in which penicillin is sufficiently stable to warrant bulk manufacture of the preparation even with storage at refrigerator temperature.—*S. Wah Leung.*

Use of Penicillin in Ludwig's Angina. David M. Bean and Walter C. MacKenzie. Canad. M. A. J. 52:568, June 1945.

Ludwig's angina is "a virulent cellulitis arising in the submaxillary region and rapidly involving the contiguous connective tissues of the neck and then the oral floor and pharynx, thus endangering the life of the patient." The hemolytic streptococcus has been recognized as the offending organism in 72 per cent of cases diagnosed as Ludwig's angina. Pneumococcus, staphylococcus and various anaerobes have also been found. The sulfonamides have been advocated for use either alone or as an adjunct to surgery. Where sulfonamide therapy has failed, successful use of penicillin has been reported. The authors have used penicillin with success since 1944. History reports of five such cases, including two in which the development of the disease followed molar extractions, are presented. All five cases were amenable to the drug therapy. The authors point out that "no therapeutic measure will ever replace tracheotomy for the patient with serious mechanical respiratory embarrassment," and "it must be clearly understood that adequate surgical decompression is demanded at the first indication of failure of the agent to control the infection."—*S. Wah Leung.*

Replantation of Teeth. Robert H. Alexander. U. S. Naval M. Bull. 45:126, June 1945.

A review of the literature revealed that cases have been reported in which replanted teeth have remained in place for from three to seventeen years. Technics for the replantation of single-rooted teeth, both without devitalization and after devitalization, and using crown and bridge cement as splints are described. It is advised that if the tooth is not devitalized before replantation, periodic checkups by x-ray and vitality tests be made and that the tooth can be devitalized should there be unfavorable developments, such as putrescence or pain.

Two cases in which replantation was done are reported.—*S. Wah Leung.*

Fractures and Fracture Dislocations of the Mandibular Condyle: A Method for Open Reduction and Internal Wiring and One for Skeletal Fixation, with a Report of Thirty-Two Cases. Kurt H. Thoma. J. Oral Surg. 3:3, January 1945.

Thoma reports an attempted improvement in the treatment of fractures involving the mandibular condyle. Two broad classifications of condylar and subcondylar fractures are considered and classified according to types. Intermaxillary fixation is usually sufficient for separation without displacement. Fractures with displacement or overriding require open reduction on most occasions. Medial dislocation is commonest. Subcondylar fractures usually do not produce posthealing discomfort or complications, while condylar ones often do. The author recommends open reductions for: (1) distracted intracapsular fractures; (2) complete condyle dislocations; (3) fractures involving the displaced articular surface; (4) forward dislocation of the head past the eminentia articularis; (5) comminuted, particularly if compounded, fractures, and (6) pseudarthrosis and ankylosis. Closed, conservative treatment is suggested for: (1) nondisplaced fractures; (2) only slight overriding; (3) nondistracted intracapsular fractures; (4) those medial, sagittal fractures of the articular head which leave a portion of the articulating surface attached to the mandible; (5) forward dislocation of the head posteriorly from the eminentia, and (6) nondisplaced subcondylar fractures. Indirect force from the opposite side has a tendency to produce medial displacement of condyles and lateral positions result from direct blows. Thoma states that previously reported treatment of condyle fractures largely suggests intermaxillary fixation to correct open-bite and lateral deviation of the jaw, but that little has been done to eliminate overriding with shortening of the ramus and dislocation or displacement of the condyle, which he considers to be the underlying cause of ensuing functional debility. He describes much of the work of others and ascribes the multitudinous suggestions to a general dissatisfaction with prevailing methods. Lateral and stereo-anteroposterior x-ray views should be obtained in all condyle fracture cases. Intermaxillary rubber traction will not correct overriding or condyle dislocation, but it should be used: (1) where open bite may occur, with or without biteblocks, which are removed at the end of the first two weeks; (2) in reduction of multiple jaw fractures; (3) in partially united, early untreated fractures of the condyle; (4) in open bite in young patients, and (5) before open reduction. Intermaxillary fixation by wires can be used where no gradual force is going to be required. Open reduction with direct wiring fixation is indicated; (1) in gross malalinement of the condyle with the ramus; (2) in cases with marked overriding and lack of molar occlusion, which would normally hold the ramus down, and (3) when overriding occurs and intermaxillary immobilization is not immediately practicable. Skeletal pin fixation may be employed to: (1) hold a dislocated condyle in position after open reduction or (2) to assist in bringing a displaced condyle in contact with the mandibular fragment. He attaches the pins to a plaster headcap or intra-orally attached splint and, on occasions, to another pin inserted in the eminentia. The technic for wiring and pin fixation is completely described. It is suggested that other fractures, if present, should be fixed by some method other than interdental ligation before open wiring is attempted, as manipulation of the jaw is required during the latter procedure. The interdental elastics are applied preoperatively. Skeletal pin fixation is used to hold completely dislocated condyles in position, often in conjunction with external wiring. This is particularly true in bilateral fractures when manipulation of the second side may dislocate the previously reduced opposite condyle. Comminuted condyles require removal of the fragments. Immobilization of the jaws is required in all types of condylar fractures. Thoma prefers Jelenko or Stout wires when their use is possible. Bandages are to be avoided.—*J. Orton Goodsell.*

DEATHS

Allen, Albert E., Akron, Ohio; Ohio Medical University, College of Dentistry, 1902; died June 18; aged 65.

Atchison, Herbert W., Clarksburg, W. Va.; University of Maryland, School of Dentistry and the Baltimore College of Dental Surgery, 1907; died June 30.

Atwell, Orville T., Zanesville, Ohio; Ohio Medical University, College of Dentistry, 1903; died June 30; aged 64.

Beachley, William E., Hagerstown, Md.; University of Maryland, School of Dentistry and the Baltimore College of Dental Surgery, 1890; died July 8; aged 76.

Bishop, Franklin, Cleveland, Ohio; Western Reserve University, School of Dentistry, 1900; died June 29; aged 66.

Butler, Stacy E., Scotland Neck, N. C.; Baltimore College of Dental Surgery, 1914; died June 12; aged 54.

Casto, Cecil Gay, Beckley, W. Va.; Ohio College of Dental Surgery, Dental Department of the University of Cincinnati, 1918; died June 17; aged 49.

Corson, W. H., Ada, Minn.; University of Minnesota, College of Dentistry, 1905; died June 17; aged 63.

Cox, Charles Bernard, Columbus, Ohio; Ohio State University, School of Dentistry, 1903; died July 5; aged 66.

Engle, Louis, Piedmont, W. Va.; Temple University School of Dentistry, 1886; died July 3; aged 86.

Finger, William M., Yonkers, N. Y.; The New York College of Dentistry, 1915; died June 23; aged 53.

Garlinghouse, John Newton, Clinton, N. Y.; Baltimore College of Dental Surgery, 1896; died May 18; aged 69.

Gillam, Charles E., Chula Vista, Calif.; University of Buffalo, School of Dentistry, 1899; died June 5, aged 73.

Goodman, Nye W., Los Angeles, Calif.; University of Southern California, College of Dentistry, 1905; died June 26; aged 64.

Hageman, George W., Hiawatha, Kan.; University of Nebraska, College of Dentistry, 1921; died May 19; aged 69.

Harris, Sara, Chicago, Ill.; Northwestern University Dental School, 1902; died June 10.

Hauge, Oscar, Long Beach, Calif.; died June 22.

Hinton, Albert L., Orlando, Fla.; Atlanta Dental College, 1916; died June 28.

Hittner, Joseph, East Orange, N. J.; killed in action on Luzon, P. I., March 22. Dr. Hittner was a captain in the U. S. Army Dental Corps.

Hull, James W., Kansas City, Mo.; Washington University Dental School, 1898; died April 28.

Hutchens, Warren B., Lake Ronkonkoma, N. Y.; Temple University School of Dentistry, 1898; died June 25.

Jaquette, William A., Philadelphia, Pa.; Pennsylvania College of Dental Surgery, 1896; died July 3; aged 69.

Jekel, Alexander S., Milwaukee, Wis.; Baltimore College of Dental Surgery, 1892; died June 23; aged 74.

Jones, Homer Dale, Hailey, Idaho; died June 7; aged 78.

Keiser, Ora F., Bryan, Ohio; Indiana University College of Dentistry, 1891; died October 30, 1944; aged 77.

Killeen, Dennis J., Pittsfield, Mass.; Temple University School of Dentistry, 1910; died May 21.

Lydon, John S., Quincy, Mass.; Tufts College Dental School, 1926; died July 1; aged 41.

Magner, Edward P., Washington, D. C.; Georgetown University, School of Dentistry, 1918; died June 30; aged 51.

Martin, Julius H., Minneapolis, Minn.; Chicago College of Dental Surgery, Dental Department of Loyola University, 1914; died June 7; aged 60.

Milling, Charles J. L., Cleveland, Ohio; Western Reserve University, 1912; died May 22; aged 56.

Moore, Lindley I., Philadelphia, Pa.; Pennsylvania College of Dental Surgery; died June 25; aged 73.

Morgan, Thomas Elwood, Cleveland, Ohio; University of Louisville, School of Dentistry, 1902; died June 26; aged 75.

ANNOUNCEMENTS

CALENDAR OF MEETINGS

National

American Dental Assistants' Association, Chicago, September 16-18. Aileen M. Ferguson, 709 Centre St., Jamaica Plain 30, Mass., General Secretary.

American Dental Hygienists' Association, Chicago, September 17-19. A. Rebekah Fisk, 1704 N. Troy St., Arlington, Va., Secretary. (Canceled.)

American Dietetic Association, Cincinnati, October 15-19.

American Society for the Advancement of General Anesthesia in Dentistry, New York, N. Y., October 22. M. Hillel Feldman, 730 Fifth Ave., New York, N. Y., Executive Secretary.

Montreal Dental Club Annual Fall Clinic, October 24-26. M. L. Donigan, Drummond Medical Bldg., Montreal, Director.

State

Arizona: State Dental Board, Phoenix, October 10. R. K. Trueblood, 25 N. Second Ave., Glendale, Secretary.

District of Columbia: Dental Society, Washington, second Tuesday of each month. J. Walter Bernhard, 1835 Eye St., N.W., Washington, Secretary.

Massachusetts: Dental Society, Boston, May 6-9. Stephen P. Mallett, President.

Michigan: Detroit's Fourth Annual Dental Review, November 8. Raymond W. Walmoth, 4421 Woodward Ave., Detroit 1, Chairman.

New York: Dental Society of State of, New York City, May 13-16. Charles A. Wilkie, Secretary.

Greater, Dental Meeting, December 3-5. Willard S. Bell, Room 106A, Hotel Pennsylvania, New York, Chairman, Press and Publication.

Ohio: State Dental Society, Columbus, November 11-12.

South Dakota: State Board of Dental Examiners, Sioux Falls, September 9-13. T. E. Barrington, Rapid City, Secretary.

West Virginia: State Board of Dental Examiners, West Liberty, June 24-27. R. H. Davis, Clarksburg, Secretary.

Wisconsin: State Board of Dental Examiners, Milwaukee, November 5-9. S. F. Donovan, Tomah, Secretary.

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Research and Educational Hospital, University of Illinois Medical Center. Address Dean, University of Illinois, College of Dentistry, 808 S. Wood St., Chicago 12.

Richmond Freeman Memorial Clinic for Infants and Children, Dallas, Texas. Dora B. Foster, 3617 Maple Ave., Dallas, Executive Director.

Walter G. Zoller Memorial Dental Clinic, University of Chicago. Address Director, Walter G. Zoller, Memorial Dental Clinic, University of Chicago, Chicago 37.

Carnegie Fellowships for Research and Graduate Work in the Dental Sciences, University of Rochester. George H. Whipple, Rochester, Dean.

Pathology, Dental and Oral, Fellowship in, Army Institute of Pathology. Address Director, American Registry of Pathology, Army Institute of Pathology, Army Medical Museum, 7th and Independence, S.W., Washington 25, D. C.

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